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Missiles of terror: Hitler's and Hussein's use of ballistic missiles

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MISSILES OF TERROR:
HITLER'S AND HUSSEIN'S USE OF
BALLISTIC MISSILES

A Thesis

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Louisiana State University and
Agricultural and Mechanical College
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Edward Scott Martin
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ABSTRACT

Adolf Hitler and Saddam Hussein were the only national leaders ever to use large-scale missile launches against American forces and their wartime allies. In both cases, the missiles were too few in number and lacked the accuracy and warhead size to be militarily effective. Use of the V-2 and SCUD missiles showed that conventionally armed ballistic missiles have minimal tactical military value and are more suitable as terrorist weapons. Indeed, the goal of those two megalomaniacal dictators was to terrorize enemy civilians and achieve a political settlement of a hopeless military situation. Each leader hoped to split the Allied coalitions arrayed against him. Hitler turned his missile against London in 1944 hoping to crush British morale and compel public opinion to demand that Prime Minister Winston Churchill seek an end to the conflict short of total victory. Hussein launched his SCUD's to exploit Arab animosity toward Israel, calculating that terror attacks would trigger Israeli military intervention, provoking a defection of Arab coalition members and forcing the United States and its European allies into a political settlement that would avert military disaster for Iraq.

The Allied forces in both cases learned lessons about the limitations of air power as a means of neutralizing a mobile target. Despite massive aerial bombing in both wars, the Allies stopped the mobile launchers only when ground troops overran the launching areas. In the Gulf War, satellites, air supremacy, and Patriot interceptor missiles failed to eliminate the SCUD threat, a task completed by the ground offensive, but such technological advances may prevent future terroristic uses of ballistic missiles.

The employment of ballistic missiles has new strategic implications because of the events of September 11, 2001. The global war on terrorism involves the newly defined “axis of evil,” composed of states capable of producing ballistic missiles. Missile technology transfers to third world countries threaten world stability, in view especially of the possible use of nuclear, chemical or biological warheads. If rogue states judge previous missile attacks to be successful, such “success” could motivate other leaders or terrorists to use their missiles as instruments of terror.

CHAPTER 1: INTRODUCTION

On June 12, 1944 Germany launched the first jet-powered flying bomb, the V-1, towards Britain. This initially terrified the British civilians until Spitfire fighters began shooting the slow-moving drones out of the sky. When the Nazis launched the first V-2 missile on September 8, 1944, however, they ushered in the age of the ballistic missile and its use as a weapon of terror. Forty-seven years later, on January 17, 1991 Saddam Hussein launched the first of many SCUD missiles against coalition forces in Saudi Arabia and civilians in Israel. Both of these leaders hoped to alter the course of their war by terrorizing civilians, thereby threatening the fragile political coalitions allied against them. By politically dividing their enemies, Hitler and Hussein sought political resolutions to their conflicts when they could not win militarily. Terror is violence targeted against civilians, committed by a belligerent to achieve a political objective. Use of these terror missiles can have a significant impact on allied diplomatic and military operations in a conflict. Both Hitler and Hussein terrorized their enemy in a vengeance-driven hope to achieve political objectives. The United States has learned political and military lessons in dealing with these two ballistic missile threats, lessons that American policymakers should apply in dealing with the threat of ballistic missiles against civilian and military targets in the war on terrorism.

The definition of terrorism is critical to any discussion of missiles as terror weapons because it highlights the significance of targeting military as opposed to civilian targets and the effects on the victims. The definition of terror used in this thesis is “the use or threat of violence, a method of combat or a strategy to achieve certain goals . . . [such as] to induce a state of fear

in the victim.” In such a strategy, “publicity is an essential factor.”¹ From its beginnings as the A-4 missile program, Reichminister Joseph Goebbels named Hitler’s missile the Vengeance Weapon II (V-2) to capitalize on its purpose as a terror weapon.² Did the missiles cause *terror* amongst the British people, or merely an inconvenience? “The blind impersonal nature of the missile made the individual on the ground feel helpless,” Winston Churchill stated. “There was little that he could do, no human enemy that he could see shot down.”³ This “terror effect” is the yardstick to determine whether these missiles were politically effective and what, if any, lessons the warring parties learned.

Use of missiles against civilians is different from other types of bombing. This is an essential differentiation between terroristic events, such as an IRA explosive detonation in London, and wartime terror tactics, such as the Nazi “blitz” bombardment of London in World War II. A key element in this difference is how terrorism, directed against civilians for political effect, is more effective with missiles than with other delivery means. A government’s defensive capability against these different terror weapons plays a role in determining the success or failure of the terrorism. Hitler launched V-1 rockets (cruise missiles) against Britain, but the Royal Air Force (RAF) intercepted the “buzz bombs,” which negated their effect. The RAF’s stand against the earlier bombing “blitz” and the “buzz bombs” galvanized the public will against the Nazis and lessened the “terror effect” because Britain had a means to defeat those terror weapons. The employment of missiles differs from other terror tactics used in war, such as

¹ Charles W. Kegley, *World Politics: Trend and Transformation*, p. 371.

² P.E. Cleater, *Weapons of War*, p. 194.

³ Winston S. Churchill, *Triumph and Tragedy*, p. 39.

massive aerial bombing raids against civilian targets, because terrorists can fire missiles which reach their targets with little warning, and there is no effective defense against them.

Why examine Hitler and Hussein? These two leaders are the only ones to use large-scale missile launches against American forces and their wartime allies. There are parallels between what they hoped to accomplish and their use of missiles for terror to achieve political gain was strikingly similar. The key element in both of these cases was that the leaders targeted civilian population centers to maximize the *terror* benefits of the missiles. Hitler and Hussein fired them in desperation, hoping to alter the course of the war when they no longer had the capability to conduct effective air strikes or other attacks against their intended targets. Each hoped to alter the political and military balance of the allied armies arrayed against them through the use of these missiles. These similarities provide a pattern to predict similar uses of terror missiles in the future.

Several parameters must be considered to focus any discussion of terror missiles. The first is the use, or threatened use, of chemical or biological missile warheads. Although Hitler and Hussein both had these Weapons of Mass Destruction (WMD) stockpiled, neither employed them. Allied deterrence prevented them from using WMD due to the threat of retaliation with similar weapons. Nuclear warheads were another WMD not available to either leader, and international treaty “regulates” their proliferation. The United States’ policy is clearly defined and unequivocal regarding nuclear weapons. Direct threats to United States territory, such as during the Cuban missile crisis, are not applicable to this discussion because that directly affects domestic policy and territorial defense. V-2’s and Soviet-designed SS-1c

missiles (SCUD's) did not directly threaten the territory of the United States, but posed a threat to its "national interests," soldiers, and allies.

A comparison of Hitler's use of the V-2 missile and Hussein's use of the SCUD missile highlights the similarities and differences in their employment and shows why, and when, a leader resorts to this terror tactic. Hussein also launched SCUD missiles in the Iran-Iraq "War of the Cities" in which he fired several against Teheran and other Iranian cities. Lessons he learned in that conflict guided his actions in the Gulf War three years later. Technological advances permitted the coalition allies to detect launches, aided attempts to prevent launches, and led to relative success in curtailing the effectiveness of, or deterring the use of these missiles. The employment of ballistic missiles has new strategic implications because of the events of September 11, 2001. The United States is currently leading a global war on terrorism involving the newly defined "axis of evil," made up of states capable of producing ballistic missiles. Missile proliferation from these states to third world countries also poses threats to world stability, with the added threat of chemical or biological warheads. Were past terror missile strikes successful, and will future terrorists in the current war use them for political gain? If the missile attacks were successful from a historical perspective, this "success" could motivate other leaders in the future to use their missiles as instruments of terror.

CHAPTER 2: V-2, THE NEW AGE OF TERROR

Two V-2 missiles screamed to earth on the night of September 8, 1944 and ushered in the era of the ballistic missile. The first one landed on the outskirts of London and destroyed twenty houses, killed three people, and injured seventeen others, while the second landed near the town of Epping and caused relatively minor damage.¹ Only two days earlier, the British Vice Chiefs of Staff had forecast “no further danger” to residents of the capital. “Except possibly for a few last shots,” they said confidently, “the Battle of London is over.”² German scientists, however, had created a revolutionary new weapon that threatened vast destruction.

For what purpose did Adolf Hitler develop this weapon? Was it designed as a militarily decisive weapon, as a vengeance weapon, or as a political weapon? This chapter provides a brief introduction to the technologically advanced missile that ushered in a new age in warfare. Examination of the V-2’s capabilities and limitations shows that its designed purpose was more political than military. This analysis demonstrates both the political and military effectiveness of the V-2’s on Britain and continental Europe. An interesting question is whether Hitler’s missiles inspired future megalomaniacs, such as Saddam Hussein, to use their missiles for similar purposes. After all, as Steven Ambrose has noted, “The V-2 was not a military weapon at all, but a terrorist device.”³ Churchill’s reactions to the V-2 threat were significant because, as a politician, he understood the terroristic dimension of the missile and its potential effect on the British

¹ David Irving, *The Mare’s Nest*, p. 285.

² James McGovern, *Crossbow and Overcast*, p. 83.

³ Steven E. Ambrose, *D-Day June 6, 1944: The Climactic Battle of World War II*, p. 31.

people and government. Examination of their effectiveness or ineffectiveness, emphasizing Allied attempts to defeat the missiles, will illustrate defensive strategies against the terror. If there were no defense against the missiles, the people would feel helpless and might demand that the government seek an end to the conflict short of total victory. Finally, if Hitler had operational V-2's a year earlier and in greater quantities, could he have prevented the Allied invasion and altered the outcome of the war? Earlier deployment of the weapon could have delayed or prevented the D-Day invasion and may have split the Allied coalition by forcing a political settlement with Britain.

Critical to the development, production, and employment of the V-2 is the question "why build it at all?" As with any new weapons technology, inventors must show government officials that investment will pay a dividend that outweighs the cost of its development. German scientists such as Werner von Braun and General Walter Dornberger needed to convince Hitler that they could produce a weapon the effects of which would justify the cost, just as American scientists had to convince President Roosevelt that the Manhattan Project could develop a weapon worth its cost, the atomic bomb. Von Braun and Dornberger set out in 1936 to build a missile that could replace heavy long-range artillery like the famous Paris Gun used by Germany in World War I. Dornberger set the specifications for the V-2 in 1936 at twice the range of the Paris Gun (200 miles) and called for a warhead 100 times the weight (one metric ton).⁴ After several weeks of intense work, von Braun and engineer Klaus Reidal produced the design of the V-2 that would strike England eight years later. They did not create the missile to be a

⁴ G. Harry Stine, *ICBM: The Making of the Weapon that Changed the World*, p. 46.

decisive weapon of war because it had only a one-ton high-explosive warhead. Rather, it was an extension of long-range artillery that was not restricted by the Treaty of Versailles and could not be intercepted like Luftwaffe bombers. In July 1943, during a presentation to Hitler by Dornberger and von Braun, the Fuhrer requested that they increase the explosive payload to 10-tons per missile. Dornberger replied that “our aim was to increase the range of heavy artillery out of all recognition by using new methods.” He continued, “. . . we can fire about a ton of explosive a hundred and sixty miles and cover targets only bombers could reach before, without risking a machine or crew. No defense against the rocket exists . . .”⁵ Dornberger clearly stated the capabilities and limitations of the V-2, while attempting to contain the Fuhrer’s unrealistic expectations.

Werner von Braun and his team of scientists set out to build a missile that would be forty-six feet long with a take-off weight of 12.5 tons and an empty weight of four tons. It was narrow enough to fit through standard European railroad tunnels and short enough to ride on one railroad car. These design specifications would allow the German army to transport V-2’s easily throughout Germany and Europe. The missiles would be launched from fixed or mobile launching sites, reach a speed of over 3,500 miles per hour, and fly to an altitude of sixty miles while traveling over two hundred miles in five minutes.⁶ The designers did not base the size and capabilities of the V-2 on any strategic or tactical needs. When first designed in 1936, the missile had no specific mission or threat because Germany was not at war.

⁵ Walter Dornberger, *V-2*, p. 105.

⁶ P.E. Cleater, *Weapons of War*, p. 94.

The V-2 was originally meant to be a technologically advanced Paris Gun. The Paris Gun was a technological achievement of German artillery engineers, but it had failed to have any significant military impact in World War I. Michael Neufeld notes that, “the most fundamental flaw in their [i.e., German scientists’ and Army Ordnance officers’] thinking lay in the lack of any well thought-out strategic concept of how the missile could actually affect the course of the war.”⁷ Dornberger, von Braun and their rocket scientists were not building a terror weapon in 1936, but an extension of long-range artillery. Interestingly, German leaders had envisioned the Paris Gun as a weapon that would terrorize the French populace and lead to a collapse of civilian morale. However, its small explosive (twenty-two pounds) and relative inaccuracy had made it ineffective as a military or a terror weapon. Neufeld continued, “Thus, in a fundamental sense the A-4 [V-2] was another Paris Gun.”⁸ The scientists and engineers lacked the strategic vision to answer the question “Once constructed, what purpose will it serve?”

Hitler visited the rocket science team at its experimental station called Kummersdorf West in March 1939. He witnessed the ignition of two prototype rocket motors and von Braun briefed him on the V-2 missile project. Dornberger recalled that Hitler showed very little interest in missile development and merely said that, “It was Grand.”⁹ Puzzled by the Fuhrer’s lack of enthusiasm, Dornberger could not understand why he did not envision the significance of missile development or its application. Germany was mobilizing for war and was building a powerful Luftwaffe of advanced fighters and bombers. This disinterest in the missile program

⁷ Michael J. Neufeld, *The Rocket and the Reich: Peenemünde and the Coming of the Ballistic Missile Era*, p. 52

⁸ Ibid.

⁹ Dornberger, *V-2*, p. 66.

led Hitler to impose several delays that hindered development and production of the future “wonder weapon.”

Hitler in 1939 foresaw no need for ballistic missiles. With his expansive war machine, he realized that he could do far more damage with manned bombers than with a missile. Bombers could carry a much heavier payload of explosives, fly farther, and were considerably more accurate than the planned ballistic missile. Hitler certainly had no need, as his armies flooded through Poland and then in 1940 the Low Countries and France, for an artillery piece that could shoot 200 miles. The failure of the Luftwaffe to win the Battle of Britain late that summer, however, was a shock to Hitler. Following his unavoidable decision in mid-September to postpone indefinitely Operation SEA LION, the projected invasion of Great Britain, the Luftwaffe would continue to try to break Britain’s morale by destroying London. For sixty-seven consecutive nights the German bombers struck at the city - without decisive effect.¹⁰

In order to understand Hitler’s V-2 terror campaign against Britain, one must examine the historical framework in which he based his strategic decisions. During the developmental stages of the V-2, Hitler was not preoccupied with destroying Britain, but the Soviet Union. Indeed, he believed that London’s unwillingness to negotiate a political settlement after the collapse of France resulted from British conviction that the Soviet Union would enter the war. In July 1940, therefore, as he started preparations for SEA LION, he ordered preliminary planning for an attack on the Soviet Union. Hitler felt that by driving eastward to capture the valuable resources of the Ukraine, he could neutralize Great Britain. With those resources of oil, iron ore, and raw

¹⁰ Arthur Bryant, *The Turn of the Tide*, p. 179.

materials from the USSR, Germany would have been the master of continental Europe without the threat of a crippling naval blockade from the Royal British Navy. After failing to force London into submission, Hitler focused his attention on BARBAROSSA, the ill-fated invasion of the Soviet Union.¹¹

Hitler had ordered his Supreme Command of the Wehrmacht, the OKW, in early 1939 to prepare plans for the invasion of the Soviet Union. He gave that instruction before signing the German-Soviet Treaty of Non-Aggression on August 23, 1939 and he continued war preparations after the pact. He explained his strategic reasoning for the Soviet invasion to his German Army Chief of Staff, General Halder, on July 31, 1940:

In the event that invasion [of England] does not take place, our efforts must be directed at the elimination of all factors that let England hope for a change in the situation . . . Britain's hope lies in Russia and the U.S.A. If Russia drops out of the picture, America, too is lost for Britain, because the elimination of Russia would greatly increase Japan's power in the Far East . . . Decision: Russia's destruction must therefore be made a part of this struggle . . . If we start in May 1941, we will have five months to finish the job.¹²

Hitler used this type of reasoning later in the war in attempting to break up the Allied coalition by forcing Britain out of the war with terror missiles. Hitler explained his political outlook on the Allied coalition to his Chief of Staff, Field Marshal Wilhelm Keitel, on August 31, 1944. "The moment will arrive when disagreements between the Allies will be so great that the break will come," he commented. "Coalitions have always failed right throughout history; you just have to wait for the moment, however difficult that might be."¹³ Hitler, as late as August 1944, was waiting for the Allied coalition to collapse.

¹¹ R.H.S. Stolfi, *Hitler's Panzers East: World War II Reinterpreted*, pp. 7-11.

¹² Allen Bullock, *Hitler, A Study in Tyranny*, p. 598.

¹³ Walter Warlimont, *Inside Hitler's Headquarters 1939-1945*, p. 452.

As the drama on the Eastern Front unfolded and Germany's strategic situation deteriorated progressively, Hitler and his military advisors made decisions that affected the development of the missile program and his attitude toward the value of such a weapon. From 1939 to mid-1943, Hitler showed little interest in the V-2 because he could not foresee the strategic value of striking Britain without the risk of losing fighters and bombers. Only in 1943, after the failure of the Luftwaffe in the Battle of Britain, did Hitler remember the V-2 project, and its ability to strike at the distant, resurgent Great Britain.¹⁴

By mid-1943 there seemed little hope that the Third Reich could win the war. The Red Army had proved to be vastly more resilient than Hitler had anticipated. Not only had it stopped the Wehrmacht outside Moscow in 1941, but it had blunted Hitler's second offensive in the USSR the following year, inflicting a catastrophic defeat on the German invaders at Stalingrad early in 1943. The stunning defeat at Kursk in July 1943 put the Wehrmacht on the strategic defensive in the East. In the meantime, Anglo-American forces, after crushing Axis forces in North Africa, invaded Sicily that same month as a prelude to an assault on Italy. The Battle of the Atlantic was also over by mid-1943, another crucial victory for the Allies. Into this bleak situation entered the V-2 ballistic missile in hopes of changing the tide of war at the eleventh hour.

This grim strategic picture explains Hitler's excitement over the V-2 after Dornberger in July 1943 showed him a film of a successful launch. Watching the film, Hitler suddenly had visions of a decisive turning point in the war, leaving Dornberger amazed by the Fuhrer's grand

¹⁴ Michael J. Neufeld, "Hitler, the V-2 and the Battle for Priority," p. 524.

expectations for the weapon. “If we had had these rockets in 1939 we should never have had this war,” Hitler declared. “Europe and the world will be too small from now on to contain a war. With such weapons, humanity will be unable to endure it.”¹⁵ By his own account, Dornberger attempted to temper Hitler’s expectations for the destructive effects of the new weapon. He downplayed the official propaganda, which proclaimed “the decisive effect these ‘all-annihilating wonder weapons’ are going to have on the war.” Dornberger was dismayed that after his years of research and development, Hitler expected the missile to do more than launch a one-ton warhead over two hundred miles; he expected it to be a decisive strategic weapon in the war. Hitler wanted “annihilation” out of this new weapon. He demanded that Dornberger increase the payload of the V-2 to ten tons and the projected monthly launchings against Britain increased to 2,000. Those numbers were totally unrealistic and Dornberger candidly said so. “We have developed this weapon,” he explained to Hitler. “We can service it and put it to tactical use. It was not our task to assess its psychological effect, its usefulness in present conditions, or its strategic importance in the picture.” He attempted one last time to convince Hitler of the limited effects the V-2 would have. “You didn’t think of it,” Hitler responded in rage, “But I did!”¹⁶

When the V-2 became an operational weapon in October 1944, Hitler wanted to launch 5000 per month at London. For him, this was simply delivering bombs by another means than aircraft. Since he no longer had sufficient aircraft or pilots available to bomb Britain, he turned to the V-1 and V-2 weapons to realize his strategic vision of victory. Hitler saw in the

¹⁵ Dornberger, *V-2*, pp. 103-106.

¹⁶ *Ibid.*

V-2 the capability to strike Britain without risking planes or pilots and he knew there was no defense against it. He hoped Britons would feel defenseless against the V-2 and apply political pressure on Churchill to seek a diplomatic end to the war. Hitler had previously stated to Albert Speer on August 2, 1943, “explosive bombs don’t work [against London], but it can be done with incendiary bombs – total destruction of London.”¹⁷ Hitler still believed in August 1943 that he could bomb England into defeat. R. V. Jones speculated on Hitler’s intentions when he commented, “I suspected that Hitler had been carried away by the romance of the rocket, just as our politicians had been carried away by its threat: for some psychological reason they seemed far more frightened by one ton of explosives delivered by rocket than by five tons delivered by aircraft.”¹⁸ Jones explains Hitler’s use of the V-2 as romantic fascination, which underestimates the political value of the missile and oversimplifies the propaganda effects in both Britain and Germany.

Walter Dornberger also saw the propaganda effects of the V-2 and its terror applications after the Luftwaffe defeat over Britain. In view of heavy Luftwaffe losses, he argued in a June 1941 memorandum that the V-2 made terror-bombing feasible. Use of the missile, against which there was no defense, would mean reduced attrition of Luftwaffe assets, as well as the possibility of all-weather attacks, he pointed out. Dornberger wanted to “sell” the V-2 program to Hitler and to the German war ministry to keep his job and his dream of accomplishing a scientific achievement alive. He clearly saw the loss of the Battle of Britain as an opportunity to promote the V-2 as an alternative to the bombing campaign. Dornberger did

¹⁷ Albert Speer, *Inside the third Reich*, p. 338.

¹⁸ R. V. Jones, *The Wizard War: British Scientific Intelligence 1939-1945*, p. 455.

not promote the V-2's military significance, but rather its potential effects on British morale. His military and civilian superiors readily accepted his terror-bombing rationale in order to protect this prestigious weapons development program.¹⁹ In underscoring the V-2's terror effects to Hitler, Dornberger ensured continued priority for the V-2 program and instilled terror as the missiles' ultimate role. The changing strategic situation over the next two years brought Hitler around to Dornberger's way of thinking, but once the "vengeance weapons" fell on London, British censorship weakened the psychological effect. The British government refused to release information on the V-2 for two months after the first missile launches until they could gauge limited public response to the new weapons. Unlike their view of the V-1, the Britons took a fatalistic approach to the V-2 and refused to live in abject fear of the weapon. It also failed to terrorize into panic precisely because they had already survived the Blitz and this bombardment was not nearly as bad. In the end, Hitler's V-2 was a terror weapon used to frighten a people he could not defeat.

Hitler saw, in the V-1 "Buzz Bomb" and the V-2 ballistic missile, an opportunity to terrorize Britain into making a separate peace, which might, in turn, lead the United States to disengage.²⁰ He could then concentrate his military efforts in the East to defeat the increasingly powerful Red Army. Albert Speer, the Reichminister of Munitions, reported that Hitler was very excited after the Dornberger briefing. "The A-4 [i.e., V-2] is a measure that can decide the war," Hitler said to Speer. "And what encouragement to the Home Front when we attack the English with it! This is the decisive weapon of the war."²¹ Further evidence of Hitler's

¹⁹ Ibid., p. 537.

²⁰ McGovern, *Crossbow and Overcast*, p. 82.

²¹ Speer, *Inside the Third Reich*, pp. 496-497.

sudden passion for the V-2 was his confession two months later to Joseph Goebbels, the minister of Propaganda, that he anticipated “great things” from the new weapon. “He believes that in certain circumstances he will be able to force the tide of the war to turn against England with it,” Goebbels noted in his diary. Days later Goebbels returned to the subject. “The Fuhrer thinks that our great rocket offensive can be opened at the end of January or early February [1944],” he wrote. “England must be repaid in her own coin and with interest for what she has done to us [saturation bombing] . . . The Giant rocket-bomb weighs fourteen tons. What an awe-inspiring murder weapon! I believe that when the first of these missiles screams down on London, something akin to panic will break out among the British public!”²² Goebbels was clearly ready to exploit the terror effects of the V-2 on the British people and the government. And Hitler remained enthusiastic. “Our hour of revenge is nigh!” he proclaimed early in November.²³

Aware that the Allies were massing an invasion force in Britain to attack across the English Channel, Hitler demanded of Dornberger and his scientists that the missile be ready to disrupt the invasion preparations. How could that be achieved? Weeks later, in December, he ordered that the missiles be aimed exclusively at London in the belief that, “as a result of this ‘long-range battle,’ if the invasion were not actually prevented, it would at least be considerably delayed and its progress seriously delayed.”²⁴ Thus, Hitler was not trying to destroy the invasion force militarily, nor was he attempting to disrupt Allied logistics. He wanted to prevent the invasion by terrorizing the British people, which presumably would force Prime Minister

²² Norman Longmate, *Hitler's Rockets*, pp. 94-97.

²³ *Ibid.*, p. 108.

²⁴ Warlimont, *Inside Hitler's Headquarters 1939-1945*, p. 403.

Churchill to agree to a political settlement. This was a strategic purpose for the V-2, one von Braun never designed it to accomplish. As it turned out, the V-2's became available too late to have an impact on D-Day preparations or the Allied invasion of France, but Germany launched them with great hopes at Britain on September 8, 1944. Hitler hoped to accomplish with missiles in 1944 what he could not do in 1940 with Luftwaffe bombers. Given his goal of forcing Britain out of the war with terror tactics, the V-2 missiles failed both militarily and politically. However, the V-2 did have a significant impact on British public opinion and achieved some tactical success in delaying the Allied use of Antwerp, Belgium as a port facility. From the first launch against London in September 1944 until the last shot on March 27, 1945, Germany struck Britain with 1,054 V-2's, of which 517 fell on London.²⁵ This bombardment killed over 2,754 civilians and military personnel and destroyed hundreds of homes. "In attacking morale, that target which so many champions of air power had proclaimed as even more important than weakening the enemy's industrial potential," notes one analyst, "the rocket was incomparably the most effective weapon so far devised: the low ebb to which spirits in southern England sank during that last and unnecessary winter of the war is evident again and again in reminiscences of the time."²⁶

Why did Hitler employ terror missiles against civilian populations? The answer is best summed up in Langer's secret wartime report, The Mind of Adolf Hitler, "He will fight as long as he can with any weapon or technique that can be conjured up to meet the emergency. The course he will follow will almost certainly be the one that seems to him to be the surest road to

²⁵ Irving, *Mare's Nest*, p. 295.

²⁶ Longmate, *Hitler's Rockets*, p. 382.

immortality and that at the same time wreaks the greatest vengeance on a world he despises.”²⁷

Hitler hoped to dominate Europe and eliminate all perceived threats to his Third Reich. He specifically blamed Britain and France for the harsh conditions placed on Germany by the Versailles Treaty that ended World War I. Hitler wanted peace negotiations with Britain after the fall of France in June 1940. The Churchill government, however, defiantly vowed to carry on the struggle. Churchill addressed the House of Commons on June 18, urging a resistance so tenacious “that, if the British Empire and its Commonwealth last for a thousand years, men will say, ‘This was their finest hour.’”²⁸ With this speech he rebuffed Hitler’s peace initiative and signaled that Britain would never surrender. Hitler hoped that London would negotiate a peace settlement and told the Reichstag on July 19th that he hoped Britain would sue for peace and end the war.²⁹ In the face of British obstinacy he thought he had no alternative but to invade England with forty Wehrmacht Divisions. When his army and navy commanders showed him how difficult that would be, he turned to his Luftwaffe to strike a decisive blow at the British power and will to defend themselves. Hitler initiated the first phase of Operation SEA LION, the invasion of England, by ordering the bombing and destruction of port facilities, coastal defenses, and the Royal Air Force. This is significant because he specifically struck military targets, although he also bombed coastal cities and civilian ports. But on September 15, he changed his bombing tactics from RAF targets to London to deliberately strike at the morale of the civilian population. This was a decisive change in strategy because Hitler moved his bombing from military targets to urban centers. He told Albert Speer he would annihilate Britain

²⁷ Walter C. Langer, *The Mind of Adolf Hitler: The Secret Wartime Report*, p. 213.

²⁸ Bullock, *Hitler, A Study in Tyranny*, p. 592.

²⁹ Warlimont, *Inside Hitler’s Headquarters*, p. 570.

by bombing it.³⁰ Because of his bombing campaign, Hitler became convinced that he could defeat Britain without landing invasion forces. He called off the invasion of England, but continued bombing.

Hitler bombed England with the Luftwaffe in the “Battle of Britain” from August 1940 to June 1941. German bombers dropped tens of thousands of bombs on all areas of Britain, killing 60,000 civilians and destroying over a hundred thousand buildings and homes. Throughout this bombardment, British morale was certainly low, but the populace refused to be demoralized. Although there is no evidence of Hitler’s knowledge of the “Trenchard Doctrine,” he certainly attempted to prove the tactic could work to his favor in defeating Britain.

The Trenchard Doctrine was a British developed theory that called for an air war in which indiscriminate area bombing of large cities would be used to break the morale of the civilian population. Its objective was to capitalize on the terror effects of bombing factories and civilians, thereby weakening the populace’s will to resist.³¹ By subjecting Britons to the Blitz, Hitler hoped to demoralize the British people enough for them to lose the will to fight and sue the government for peace. With this strategy Hitler, having failed to accomplish it through bombing, turned to ballistic missiles in late 1944. The questions to be answered are, “Why did Hitler fail to bomb the civilians into defeat in 1940-1941” and “Why did he attempt to do the same with ballistic missiles in 1944-1945?”

Hitler expended a tremendous amount of pilots, planes, and explosives trying to bomb Britain out of the war. He lost thousands of aircraft and pilots in these costly raids over

³⁰ Speer, *Inside the Third Reich*, p. 272.

³¹ Andrew Boyle, *Trenchard*, p. 312.

England. The Luftwaffe did not have an adequate heavy bomber like the RAF's Lancaster or the American B-17 Superfortress to carry out strategic bombing. Hitler relied on the Heinkel medium bomber and the Stuka dive-bomber, both of which were inadequate for the large-scale bombing of cities. His bombing strategy also played into the hands of the defenders. Instead of bombing the RAF airfields, aircraft factories, and radar installations, Hitler allowed Britain to retain its defensive capability, which then took a devastating toll on his bomber formations. Even before Hitler launched V-2's at England, the British Intelligence Services were keenly concerned about the new threat and its potential effects on British morale.

Scientific Intelligence experts R.V. Jones and Duncan Sandys desperately developed estimates of the missiles' capabilities to determine what effects they would have. Other members of the Crossbow Committee³² determined that the missiles could have a warhead of as much as ten tons of explosive. Some experts were near panic, according to Jones, and wanted to evacuate a million people from London, as well as divert invasion forces to the launching areas to eliminate the threat.³³ In reaction to the Buzzbomb attacks on London and the anticipation of V-2 attacks, nearly one and a half million people did abandon London.³⁴ Churchill wanted drastic retaliation. At first, he thought of selecting a hundred small German towns for total destruction if the attacks did not cease. When they did not, he pondered the use of poison gas against Germany. "If . . . great rockets with far reaching and devastating effect fall on many centers of

³² Winston S. Churchill, *Triumph and Tragedy*, pp. 42-43. The Crossbow Committee was a British Inter-Service Committee, chaired by Mr. Duncan Sandys, charged by Churchill with the responsibility for reporting on the effects of the V-1 and V-2 and the progress of Allied countermeasures to defeat them. The committee reported directly to Churchill and the British War Cabinet.

³³ Jones, *The Wizard War*, p. 445.

³⁴ Michael Howard, *British Intelligence in the Second World War: Strategic Deception*, p. 181.

Government and labour I should be prepared to do ANYTHING [sic] that would hit the enemy in a murderous place,” he declared. “I may certainly have to ask you [the British War Cabinet] to support me in using poison gas.”³⁵ Churchill felt terrible because, as victory seemed near with the collapse of Hitler’s army in Normandy, “the sudden appearance of the flying bombs made it possible for Germans to turn the tables on Britain by paralyzing the Government and devastating Whitehall.”³⁶ Churchill wrote very little in his autobiography about the V-2 attacks, observing simply that, “in pilotless aircraft and the rockets Hitler and his advisors saw a means of delivering a new and possibly decisive attack upon England.” He also noted the possibility of V-2’s “rupturing the Anglo-American plans for a major cross-channel return to the continent. The Fuhrer hurled the utmost German effort into this new and perhaps last hope.”³⁷ But at the time Churchill was so fearful of British reaction to the new V-weapon that he withheld official announcement of its use against Britain until November 10, 1944, thus giving the government time to gauge its impact on civilian morale.³⁸ “The effect of the new German weapons was very noticeable upon morale,” recalled General Dwight D. Eisenhower, the Supreme Allied Commander.³⁹

The V-2 bombardment of London had a negative effect on British morale, but certainly not on the scale that Hitler desired. Indeed, just as during the Battle of Britain in 1940, the British now became more focused, more resolved to fight to the bitter end. They were determined to outlast Hitler’s last desperate measure. Although the death and destruction

³⁵ Richard Lamb, *Churchill as War Leader*, p. 308.

³⁶ *Ibid.*, p. 32.

³⁷ Winston S. Churchill, *Closing the Ring*, p. 230.

³⁸ McGovern, *Crossbow and Overcast*, p. 84.

³⁹ Dwight D. Eisenhower, *Crusade in Europe*, p. 259.

caused by the V-2 was more than twice that of the V-1, Londoners feared the Buzzbombs more than any other terror device.⁴⁰ Unlike the V-1, which had a motor that sputtered along loudly enough to announce its approach, the V-2 came in silently, faster than the speed of sound, and without warning. Since the V-2 could not be seen, heard, or intercepted it was not as terrifying to those who withstood its attack.⁴¹ Even Churchill alluded to the value of knowing when a V-1 was approaching. “Although the warheads were of much the same size, the strident engine of the flying bomb warned people to take cover. The rocket approached in silence.”⁴² Londoners realized that they were powerless to stop the missiles or protect themselves from the attacks. “Since there was nothing anyone could do about V-2, there seemed no point in worrying about it unduly; the response to it was almost fatalistic.”⁴³ Hitler’s great terrorizing weapon failed to shake the confidence of the British population – and it failed to deter the British from bombing German cities. Allied firebombing of Hamburg, in the summer of 1943, had been particularly devastating, causing massive material damage and tens of thousands of civilian deaths. Hamburg had suffered the fate that Air Marshal Herman Goring and Hitler had conceived for London in 1940. “Hitler succumbed to the unrealistic hope that a few massive air strikes on London might persuade the British to give up their pounding of Germany,” Speer remembered.⁴⁴ Hitler never broke the English spirit to resist.

The British people were defiant and resilient primarily for two reasons: they had the means to resist and a strong leader to motivate them. The British arrayed their defenses in

⁴⁰ Irving, *Mare’s Nest*, p. 291.

⁴¹ Eisenhower, *Crusade in Europe*, p. 258.

⁴² Churchill, *Triumph & Tragedy*, p. 53.

⁴³ McGovern, *Crossbow and Overcast*, p. 84.

⁴⁴ Speer, *Inside the Third Reich*, p. 337.

depth to engage the German bombers. British radar warned of the raids, anti-aircraft artillery met them at the coast, the RAF Spitfire and Hurricane fighters engaged them over the mainland, and barrage balloons prevented low level bombing over the cities. Thus, the British people could fight each day and night, against a known enemy threat and enjoy success in shooting down some of the raiding bombers. Hitler could not break the British spirit as long as they had the means to resist. Britain also had its tenacious Prime Minister, Winston Churchill, whose leadership and optimism assured Britons that they would prevail. The British people believed in Churchill and stood by his unflinching belief that Britain would never give in, would never surrender. A Gallup Poll in October 1940 showed an 89 percent approval rating for Churchill among his countrymen.⁴⁵ The fact that Great Britain was fighting alone against Hitler as the last bastion of a free Europe probably stiffened British resistance, and certainly the hope that the United States sooner or later would enter the conflict fueled British determination.

London was a political target, but the port city of Antwerp was a military one. Whereas London provided a target twenty miles wide and eighteen miles deep at the end of the V-2's flight, Antwerp was a continental port city the Allies needed to sustain their offensive drive towards Germany. The Germans hit Antwerp with 1100 more V-2's (1675) than they launched at London. The Belgians thus suffered a V-2 attack proportionately much greater than Londoners faced over a much shorter time frame. On one occasion a V-2 missile hit a crowded theater in Antwerp and killed nearly 500 people.⁴⁶ American postwar analysis showed that the V-weapon severely retarded the unloading of supplies in Antwerp and inhibited

⁴⁵ Lamb, *Churchill as War Leader*, p. 74.

⁴⁶ Longmate, *Hitler's Rockets*, p. 382.

its usefulness.⁴⁷ Hitler switched his targeting for two reasons. The Allies were driving eastward from France and had overtaken many of the launching areas and storage depots. Hitler also needed to hinder the Allies' resupply operations and thus their advance while he prepared a counterattack. Although V-1's and V-2's caused significant damage to Antwerp, too few were fired to stop the flow of Allied supplies and reinforcements pouring from its harbor. The heaviest attacks occurred on December 23 and the day after Christmas, when twenty-six ballistic missiles, each carrying one-ton of explosives, struck the city, but that was hardly a force capable of shutting down the port. Just as the Londoners had, the Belgians simply had to carry on until the Allies could put an end to the bombardment.

Allied armies never developed an effective countermeasure to stop a V-2 once it was fired. Britain and the United States employed spies, radar, radio intercepts, aerial reconnaissance, and their own research and development to determine the viability of the V-2 as a weapon and possible ways to defeat it. The British bombed the research and testing facilities and tried to capture V-2 wreckage from Poland and Sweden in order to determine its weaknesses. They bombed known or suspected fixed and mobile launching sites. Allied fighter planes flew constant air patrols hoping to see a launch and then pounce on the firing battery crews and equipment. Allied bombers struck at suspected V-2 storage bunkers, rail lines used to transport missiles, and production facilities, and also sought out factories manufacturing the missile fuels, liquid oxygen and alcohol. Finally, with the collapse of the German army, Allied ground troops captured the launching areas, missiles, and firing batteries. Each of these Allied

⁴⁷ Irving, *Mare's Nest*, p. 294.

methods of interdiction achieved some success and the Allies gained valuable lessons learned from them.

The British Intelligence Service expended a great amount of time and effort to determine the capabilities and limitations of both the V-1 and V-2 weapons. The Crossbow Committee investigated both weapons systems, so it is impossible to determine the exact cost of the investigative effort for each V-weapon. Intelligence reports from spies as early as 1939 alerted the British to the German missile program. British intelligence dismissed those reports, reasoning that since Britain did not have a missile development program, there could not be any significance to the German “rocket.” After a reconnaissance flight by an RAF fighter, the British finally bombed Peenemünde on August 17, 1943 and inflicted significant damage, although by then the German scientists had overcome the V-2’s developmental problems and the first successful flight of the missile had taken place nearly a year earlier. The most significant effect of this first Allied bombing was to delay development while the Germans transferred the missile program to Blizna, in Poland, and moved production underground.

British Intelligence continued to receive reports of missile firings and development through partisans in France and Poland, and escaped prisoners of war whom the Germans had forced to work on the V-2 project. Reports from the Polish underground about enemy plans for a 24-ton missile with a warhead of several tons caused alarm in British circles.⁴⁸ England tracked several V-2 launches from Peenemünde and developed key range and trajectory data. Missile parts captured by Poles and Swedes, in separate incidents, gave the Crossbow

⁴⁸ Jones, *Wizard War*, p. 435.

personnel a greater appreciation for the V-2's capabilities. With the intelligence effort in full swing, the bombing effort continued to target launching sites.

A critical failure of British intelligence was the belief that the V-2 required an elaborate launch facility or prepared site, such as the V-1 catapults. British reconnaissance aircraft spent thousands of flight hours looking for concrete bunkers and fortifications for V-2 launch facilities. After viewing the launching facility at Peenemünde and a massive firing bunker in France, British analysts assumed that V-2's had to be launched from hardened concrete launching pads. The Allies destroyed all known fixed launch sites, but the mobile missiles remained a problem until their armies overran the firing areas. The German's ability to launch a V-2 within two hours from mobile Erector-Launchers in any open field or road confounded all attempts to interdict the mobile vehicles.⁴⁹ The Allies were able to gain limited air superiority for short periods over the suspected launch areas but could not maintain the coverage necessary to interdict the elusive vehicles. The majority of V-2 launches against London and Antwerp were from the central city park in The Hague. This was one of the last secure areas from which the German launch crews could fire their missiles at London 200 miles away up until March 1945. Allied reconnaissance, followed by bombing, failed to stop the launches because the Allies, not knowing what launch signs to look for, bombed areas that had long been evacuated by the mobile launching crews. They also lacked soldiers behind enemy lines who could report on the movements of launch vehicles. The V-2's could be driven anywhere and erected on their fins, fueled, and fired without warning.⁵⁰

⁴⁹ Stine, *ICBM*, p. 86.

⁵⁰ McGovern, *Crossbow and Overcast*, p. 85.

Werner von Braun claimed after the war that the Allies had never hit a V-2 at a mobile launch site.⁵¹ The test missile captured by the Polish underground had a radio-control mechanism on it to aid the German scientists in their research. Because the British did not know the reason for the antennae on the missile, they assumed it was radio controlled and expended great effort attempting to jam the non-existent missile guidance radar. British long-range radar could identify V-2 launches and pinpoint the launching sites with some accuracy, but they lacked the Communications, Command, and Control capabilities to effectively seek and destroy the launchers. The Allies could not direct loitering fighter aircraft onto the launch sites in time to have any practical benefit.

The next countermeasure attempted by the Allies met with limited success. They generally knew the launching areas, so they bombed all railroads, bridges, and roads into them to restrict movement of the launching crews and to slow the flow of replacement missiles. From October 15 to November 25, 1944 the Second Tactical Air Force flew nearly 10,000 sorties and the Fighter Command another 600 missions attacking bridges and roads near The Hague to interdict missile resupplies. German records after the war showed that the Allied effort damaged two trainloads of missiles badly enough that they had to be scrapped.⁵² After D-Day, the Allies captured German maps, which showed V-1 and V-2 areas, and bombed the sites with little effect because the V-2's had already been withdrawn to secure positions.

Allied strategic bombing did some damage to V-weapon facilities, but it was largely inadvertent. The RAF attacked the Zeppelin works as a suspected radar factory, for example,

⁵¹ Ibid.

⁵² Irving, *Mare's Nest*, p. 292.

Allied planes bombed a V-2 assembly plant in the belief that it was an aircraft factory, and they bombed a Peenemünde pilot rocket-assembly factory as a suspected hydrogen peroxide plant.⁵³ Many of these indiscriminate bombing raids against civilian industrial centers had unforeseen impacts on the V-2 and other weapons programs. In applying the Trenchard Doctrine,⁵⁴ the Allies struck at German war industry in the belief that they would achieve victory more easily by destroying Germany's manufacturing capability so that it could not replace V-2's and other weapons expended or lost in battle. Allied strategic bombing had some impact on the V-2 launches, but little compared to the final countermeasure, that of capturing the weapons and crews with infantry soldiers on the ground.

Winston Churchill himself recognized that air power had not stopped V-2 launches against Britain. "As to V-2," he remarked on March 28, 1945, "nothing has been done or can be done by the RAF."⁵⁵ The Allies hoped that by advancing northeast from the Normandy beaches they would overrun the V-weapon launch sites and end the terror against London. When they captured Calais and the launches continued from The Hague, the Allies executed the airborne assault MARKET GARDEN, attacking into Holland to cut off the firing batteries. Asked by Churchill in September 1944 to estimate when the remaining area in Holland within V-2 range of London would be liberated, General Montgomery replied that the projected airborne landings at Arnhem would cut off the rocket troops from their supplies.⁵⁶

⁵³ Ibid.

⁵⁴ The Trenchard Doctrine proposed that a sustained bombing campaign of factories and civilians would gradually undermine civilian morale and weaken an enemy's will to resist.

⁵⁵ Irving, *Mare's Nest*, p. 307.

⁵⁶ Ibid., p. 287.

The Allied airborne assault at Arnhem was a failure, “a bridge too far,” and so the Germans quickly moved their hastily evacuated missile batteries back into The Hague to continue firing on London. Because of that failure, London had to sustain six more months of V-2 bombardment before the Allies could finally interdict the launching sites. Allied troops destroyed the rail and road systems between the assembly plants and Holland, captured the liquid oxygen facilities, and drove the firing batteries out of Holland. The Germans fired their last V-2 against Britain on March 27, 1945 and retreated to the Reich for the remaining month of the war.⁵⁷ Only by putting soldiers on the battlefield and capturing the V-2’s and their launching areas were the Allies able to stop the ballistic missile attacks.

In 1943 and early 1944, Hitler’s strategic gamble was that the V-2 would be operational early enough and in available quantities to defeat the Allied invasion forces massing along the British coast. He wanted to bombard the coastal ports of Britain with 5000 V-2’s a day to prevent the D-Day landing he knew would someday come. Once the Allies successfully established the Normandy beachhead in France, his gamble with the V-2 turned to forcing Britain out of the war by terrorizing London. If Hitler had operational V-2’s a year earlier and in greater quantities, could he have prevented the Allied invasion and altered the outcome of the war?

The United States Strategic Bombing Survey noted after the war, “Had the Germans started the V-2 campaign a year before the actual use and with 10 times the quantity involved, the story . . . might have been considerably different, as there were no known countermeasures, except the bombing of the launching devices . . . [which were] small, portable, and easily

⁵⁷ McGovern, *Crossbow and Overcast*, p. 86.

camouflaged.”⁵⁸ Eisenhower stated in his memoirs that V-2’s could have altered the outcome of the war. “It seemed likely that, if the German had succeeded in perfecting and using these new weapons six months earlier than he did, our invasion of Europe would have proved exceedingly difficult, perhaps impossible,” he argued. “I feel sure that if he had succeeded in using these weapons over a six-month period, and particularly if he had made the Portsmouth-Southampton are one of his principal targets, Overlord might have been written off.”⁵⁹ The Supreme Allied Commander of European Allied forces believed the V-2’s could have had a significant impact on the Allied invasion if Hitler had them earlier and had targeted key ports.

However, Hitler told his trusted commanders in June 1943 that they needed only to hold out against the Allies because London would be leveled by the end of 1943 and Britain forced to capitulate.⁶⁰ This clearly indicates that Hitler’s intent for his missiles was to bombard London in the same manner he used bombers in 1941. It is unlikely that Hitler would have targeted port cities with the V-2 and would have attacked the larger target of London instead. It is worth noting, however, that the accuracy of the V-2 improved dramatically as the distance to the target decreased. Just as with the Paris Gun or any artillery shell, the farther it flew the less accurate it became. If Hitler had been able to launch them from the firing emplacements he built on the French coast, he could have hit targets in Britain a mere 40 miles away instead of the 200 mile targeting he did later in the war. With a higher degree of missile accuracy earlier in the war, Hitler’s bombardment would have been more effective and caused more damage to coastal cities and invasion forces.

⁵⁸ Ibid., p. 265.

⁵⁹ Eisenhower, *Crusade in Europe*, p. 260.

⁶⁰ Longmate, *Hitler’s Rockets*, p. 113.

Hitler thought the V-2's would save his crumbling Reich even after the Allied invasion of France. He ordered his OKW staff in September 1944 to save the launch sites in France to launch V-2's.⁶¹ Earlier in 1943, Hitler thought that his V-1 and V-2 launching sites in the Pas-de-Calais would necessitate an Allied invasion there to stop the launchings.⁶² Hitler thought his missiles would be decisive in dictating the invasion target and insisted on his army holding the launch sites in France. If Hitler had possessed an operational V-2 arsenal six months earlier, he certainly could have targeted the coastal cities of England and could have had some impact on the D-Day landing preparation. However, given Hitler's previous statements about leveling London, it is unlikely that he would have targeted Allied military forces. Hitler seemed to understand the V-2's primary purpose as a terror weapon and was determined to use it as such. Although it is impossible to predict the coalition reaction to V-2 missile attacks in April of 1944, it could not have invaded France any earlier due to the inclement weather in the Channel. It could have conducted an unconventional warfare campaign using commando forces and the French underground against the launching facilities, railroads, bridges, and storage facilities. This scenario, however, could have adversely affected the invasion plans, cost valuable Allied lives, and would have destroyed the lines of communication the Allies needed for the push through France.

The missile's effectiveness must be measured from several different viewpoints.

The missile had a noticeable impact on British morale and Churchill. Although the British adopted a fatalistic approach to the missile's destructive power, the V-2 worried Churchill more

⁶¹ Warlimont, *Inside Hitler's Headquarters*, p. 478.

⁶² Ambrose, *D-Day June 6, 1944: The Climactic Battle of World War II*, p. 37.

than any other German weapon and he considered the use of anthrax and chemical warfare to retaliate against Hitler. But Churchill's strength as a war leader inspired the British to resist through the Blitz, through the threat of an invasion, and certainly through the V-weapon attacks. His stubborn leadership mitigated the terroristic effect of the V-2. Militarily, at the late stage of its introduction, the V-2 caused significant casualties and damage to buildings; on balance, however, it was an ineffective weapon of war.

All Allied attempts to interdict the missile while in its launch configuration or after launch were futile. British and American air power never prevented a V-2 launch, although Allied planes delayed its deployment by bombing fuel refineries, storage depots, and railroads. Ultimately, by defeating the German army, and forcing it back into Germany, the Allies were able to stop Hitler's V-2 attacks. With his defeat, the first use of ballistic missiles ended as a political and military failure. From the ashes of Dornberger's V-2 program, Britain, the United States, and the Soviet Union scrambled to capture the scientists and missile components to begin their own missile programs. As the missile race began and the technology spread, new national leaders would see ballistic missiles as symbols of power and seek their use as missiles of terror.

CHAPTER 3: SCUD, THE POLITICS OF TERROR

Forty-seven years after Hitler used the V-2 to terrorize the Allied coalition in World War II, Saddam Hussein used the SCUD missile in two different wars. He initially employed SCUD's against Teheran in the "War of the Cities" with neighboring Iran. Iraq's SCUD's terrorized Iran's capital, while Iran retaliated by initially sending fighter-bombers against Baghdad and later unleashed its own SCUD's against Iraq. During Desert Storm, Hussein launched missiles purely for political effects against Israel, and for political and military effects against Saudi Arabia. Hussein attempted to exploit Arab animosity toward Israel, hoping that if he could trigger, through SCUD attacks, Israeli military intervention, the Arab members of the coalition might abandon the fight. He also attempted to disrupt Allied preparations for the invasion of Kuwait by firing several SCUD's at military forces in Saudi Arabia. Although it is clear that Hussein did not split the coalition or win a favorable political settlement, the SCUD missile launches did force the Allies to divert considerable air and ground assets to hunting SCUD's. The launches desynchronized and delayed the preparations for the ground war to liberate Kuwait. The vast array of assets used to defeat the SCUD launches included satellites, reconnaissance aircraft, fighter-planes, helicopters, British Special Air Service (SAS) teams, and Special Forces soldiers to find the SCUD launching locations. Once Iraq launched missiles, Allied satellites tracked them and Patriot missiles successfully intercepted several SCUD's. The success of these interdiction efforts determined what lessons the Allies learned from the anti-missile campaign. Examination of Hussein's use of missiles for terror in these two wars demonstrates that his intentions were to achieve a political victory through terrorizing civilians.

In September 1980, Hussein launched preemptive air strikes against Iranian airfields to start the eight-year Iran-Iraq War. After initial gains by the Iraqi army, the war turned to stalemate with both sides incurring huge losses. In 1982, Iraq started firing SCUD's and short-range rockets at Iranian military forces and population centers, but lacked the range necessary to strike Teheran. Two years later, Iraq initiated its use of chemical weapons on the front lines to break the stalemate, a step that confirmed Hussein's adherence to a doctrine of first use of weapons of mass destruction.¹ During 1984, each side also dispatched fighter-bomber raids on the other's capital and early in 1985 Iran fired SCUD's it acquired from Libya at Iraqi cities, including Baghdad.² The Hussein regime began a missile improvement program to extend the range of its SCUD's and eventually produced two longer-range SCUD variants: the Al-Husayn and the Al-Abbas. The Al-Abbas had an increased range of 400 miles, twice that of the SCUD-B, and could reach Teheran, albeit with a much smaller warhead than the original SCUD.³ Finally, in February 1987, Iraq fired 150 SCUD's at Teheran in an effort to break civilian morale and undermine popular support for the Khomeini government.⁴ This chronology of terror raises several questions about Hussein's motivations for terror strikes against civilians, his use of chemical weapons and the threat of chemically armed SCUD's, and the lessons he learned that would play a key role in the Gulf War.

Saddam Hussein learned in the Iran-Iraq War that by targeting Iran's capital he could break the will to fight of the Iranian government. "The success of ballistic missile strikes in the

¹ Janne E. Nolan, *Trappings of Power: Ballistic Missiles in the Third World*, p. 84.

² W. Seth Carus, *Ballistic Missiles in the Third World*, p. 5.

³ Richard P. Hallion, *Storm Over Iraq: Air Power and the Gulf War*, p. 178.

⁴ J. N. Westwood, *The History of the Middle East Wars*, p. 189.

War of the Cities in 1988 that encouraged both sides to end hostilities,” Seth Carus states, “was less the result of the strike’s military utility than their psychological effects in adding to the atmosphere of desperation and exhaustion that prevailed in both countries.”⁵ Hussein launched the attack on Iran to secure a quick victory and claim the Shatt-al-Arab waterway, which separated the two countries. He wanted to take advantage of a weak Iranian Revolutionary government that was politically and militarily isolated after the fall of the Shah. The Iranian government had conducted a purge of its military officers, and lacked replacements and spare parts for its western military armaments. Hussein also hoped to capitalize on the general lack of popular support in Iran for the new government because of the imposition of strict Islamic Fundamentalism and oppression of those who did not readily submit to the new regime. When Hussein began missile strikes on cities in 1982, he believed he could demoralize the Iranian civilians and cause the Iranian soldiers to retreat home to care for their families. Possessing no missiles, Iran responded by bombing Iraqi cities, including Baghdad.

As the ground war stagnated, Iraq in 1984 resorted to using chemical weapons against front-line soldiers and cities. This led to an evacuation of the forward Iranian cities and a reduction of the support bases for the Iranian military forces. Iraq’s use of chemical bombs delivered by aircraft is significant because it continued to fire high explosive warhead SCUD’s at Iranian cities. Iran suspected that Iraq was working to develop chemical warheads for its SCUD missiles. Reports surfaced in 1988 alleging that Iraq had already equipped some of its

⁵ Carus, *Ballistic Missiles*, p. 84.

SCUD's with chemical warheads.⁶ In 1984 Iraq did not have a missile capable of reaching Teheran, but Hussein worked to correct that deficiency.

Why did both countries use bombing and ballistic missiles to terrorize civilians? Iraq initiated the missile and bomb strikes on civilians to break the morale of the Iranian civilians and soldiers. This, Hussein hoped, would break the stalemate in the ground war and lead to the negotiated settlement he had sought since his invasion bogged down.⁷ Showing his frustration with the war, Hussein tried to bomb civilians into submission. Iran retaliated by bombing Iraqi cities for revenge. Until 1985, Iran had no missiles to strike at Iraq and therefore retaliatory bombing was its only deterrent against the SCUD attacks on its cities. Its air force strikes on Iraq were limited, however, by Iraq's superior aircraft and the limited availability of Iranian aircraft and parts. Iran escalated the War of the Cities when it launched Libyan supplied SCUD's against Baghdad in 1985. Iran was unable to acquire fighter aircraft and parts during the war, but the SCUD's gave it a new capability to terrorize Baghdad. The Iranian Air Force was no longer capable of conducting deep strikes so it turned to missiles, against which Iraq had no defense. Additionally, Iran could strike the Iraqi capital from a mere eighty miles away, while Teheran was comfortably 400 miles away from the front lines.⁸

Iran argued that its use of missiles against Baghdad was as a deterrent against future attacks by Iraq. Although this clearly failed to prevent Iraqi retaliation, both Iraq and Iran justified their use of missiles by stating their deterrent value. The speaker of the Iranian parliament proclaimed in March 1988 that "for us, missiles have a deterrent role" and added

⁶ Trevor Findley, *Chemical Weapons and Missile Proliferation*, p. 56.

⁷ Westwood, *The History of the Middle East Wars*, p. 188.

⁸ Hallion, *Storm Over Iraq*, p. 178.

that Iran needed to strengthen its missile forces “so that the very thought of an attack with missiles will be eliminated from our neighbor’s mind.” Iranian leaders publicly acknowledged that a powerful missile force could act to deter Iraqi aircraft or missiles from striking their cities. The Iraqi leaders also indicated that their employment of missiles during the later stages of the war was linked to Iranian attacks on Iraqi cities.⁹ These missile strikes on civilian targets obviously failed to deter further aggression from either side. They did, however, have a profound effect on the outcome of the war, as Iraq introduced its long-range SCUD variants. Iraq fired approximately 190 SCUD’s against Teheran in 1988.¹⁰ This led to an Iranian exodus of over 100,000 civilians from the capital, which significantly eroded public support for the war.¹¹ Hussein did not need to bombard Teheran with SCUD missiles; he wanted retribution for the Iranian missile strikes on Baghdad.

By 1988, Iraq had a vastly superior air force capable of delivering significantly more ordnance than its SCUD missiles. In early 1987, Iraq struck Teheran with Mirage F-1 fighter-bombers flying 400 miles to the Iranian capital in 45 minutes. The SCUD’s he launched in 1988 could reach Teheran in eight minutes. However, in the first two weeks of March 1988 Iraq fired sixty-eight SCUD’s, carrying a total of 13 tons of explosives, at Iranian cities. During the same period, the Iraqi Air Force dropped 731 bombs weighing 314 tons on Iranian cities. Clearly Hussein had the capability to terror-bomb civilians with much greater destructiveness, accuracy, and a higher rate of delivery with fighter-bombers than with missiles. The Iraqis never

⁹ Carus, *Ballistic Missiles*, pp. 8-9, 45, 47.

¹⁰ Nolan, *Trappings of Power*, p. 55.

¹¹ Findley, *Chemical Weapons and Missile Proliferation*, p. 55.

fired more than eleven missiles in one day, which is significantly fewer than their aircraft sorties.¹² Hussein used the terror effects of ballistic missiles against his enemy's capital to destroy the people's will to fight.

Hussein also learned in the "War of the Cities" that the psychological effects of missile bombardment could win him a political gain. Carus described both countries' use of SCUD's, "The use of ballistic missiles secured no military gains for either side. It seems instead to have brought home the futility of the enduring stalemate after seven years of combat and thus weakened support for continuing the conflict." Iraq and Iran used SCUD missiles against each other's cities in an effort to undermine the morale of the enemy population. The former Central Intelligence Agency (CIA) Director, William Webster, said of Iraq's use of SCUD's, "Iraq's ability to hit Teheran caused a sizeable portion of the population to flee."¹³ This undoubtedly affected the Iranian government's ability to control its population and sustain support for its ongoing war.

There are several reasons why Hussein was successful in using terror missiles to defeat Iran politically. Iran's Revolutionary government was very weak and lacked total support from its people. Iran rallied its fervent youth to fight the invading army, but the Khomeini government lacked popular support. Iran was critically low on weapons and supplies and was quickly losing the ability to defend itself. The stalemate in the eight-year war dragged on with no end in sight and no great victories to rally the people. Iraq previously had used chemical weapons and this threat of chemical ballistic missile strikes played a role in the mass exodus of civilians from

¹² Carus, *Ballistic Missiles in the Third World*, pp. 28, 36-37.

¹³ *Ibid.*, pp. 7,84.

Teheran. Finally, Iran was a political pariah whose only support in the war was from Libyan and North Korean arms sales. Iran accepted the United Nations peace resolution in July 1988 because the Islamic Republic feared a collapse of the government from political unrest. Hussein's terror missiles worked because the weak isolated government of Iran could no longer support itself after eight years of stalemate warfare.

In the Gulf War, Saddam Hussein faced an Allied military coalition of nearly forty countries arrayed against him. Although he had a modern air force with up-to-date fighter aircraft, he quickly lost the ability to employ it. In the first three days of combat with coalition pilots, Iraq lost sixteen aircraft and by the ninth day the Iraqi Air Force was no longer a factor in the war. Overall, the coalition downed thirty-five Iraqi fighters, destroyed over 200 aircraft on the ground, and sent an additional 137 scurrying for safety in Iran. Hussein reportedly attempted one bombing raid against Saudi Arabia using TU-16 Badger medium bombers loaded with chemical bombs. Allied intelligence intercepted the plan and sent bombers to destroy the raiding force on the ground before it could take off. With the Iraqi Air force neutralized in the first week of the air war, Hussein turned to his only remaining offensive weapon to strike at the Allied coalition and Israel.

He fired a total of eighty-six SCUD's during the forty-five days of the Gulf War against two countries, Saudi Arabia (46) and Israel (40).¹⁴ With the SCUD's' limited military effectiveness, Hussein hoped to gain politically from the propaganda value of striking with his only viable offensive weapon. More important, however, was his attempt to split the coalition

¹⁴ Bert Kinzey, *The Fury of Desert Storm: The Air Campaign*, pp. 16, 18, 132.

by targeting Israel and hoping to entice a military response from the neutral Jewish country. Hussein wanted to exploit the animosity between Israel and the Arab members of the coalition by involving Israel militarily and forcing the Arab coalition members to withdraw their support for the war, and possibly forcing an early political end to the conflict. As Hallion notes, “SCUD attacks could have resulted in Israel entering the war, with unknown but certainly ominous implications for coalition unity.”¹⁵ Many of the coalition’s Arab members had previously fought against Israel in several Mideast conflicts. Egypt, Syria, Kuwait, Saudi Arabia, Morocco, and Iraq all fought as allies against Israel and it was this historical relationship that Hussein hoped to exploit. From western Iraq, his SCUD variants could reach densely populated Israeli cities and terrorize Israel. He reasoned that if he struck Israel, it would respond by violently striking back at Iraq. Israel had historically retaliated against any attack or threat and had previously bombed an Iraqi nuclear power facility in June 1981 that it suspected of developing nuclear weapons. Israel also adhered to the “preemptive counterforce doctrine,” which aims to limit damage to Israel by striking at the territory of its enemies and “decisively destroying its ability to wage war.” He hoped that Israel’s retaliation would divide the Allied coalition by putting the governments of Egypt, Saudi Arabia, and Syria on the same side as the Israelis, a situation that those governments could not possibly survive.¹⁶ Also, the introduction of “Zionist” forces into the Gulf War would anger Jordan, Syria, and Saudi Arabia because the Israeli Air Force would violate their airspace in order to bomb Iraq.¹⁷ Hussein had threatened Israel as late as May 1990. “Therefore it behooves us to declare clearly that if Israel attacks and strikes, we will

¹⁵ Richard P. Hallion, *Storm Over Iraq: Air Power and the Gulf War*, p. 245.

¹⁶ J. N. Westwood, *The History of the Middle East Wars*, p. 203.

¹⁷ *Ibid.*, p. 180.

strike powerfully,” he proclaimed. “If [Israel] uses weapons of mass destruction against our nation, we will use against it the weapons of mass destruction in our possession.”¹⁸ Hussein tried to mobilize Arab hatred of Israel into a divisive tool to create internal friction within the coalition.

The Iraqi strongman was focusing on a grave coalition vulnerability. “No Israeli government could be seen as failing to protect its people from an Arab attack,” General Colin Powell worried. “Yet, if we were going to preserve the Arab end of the coalition, we had to keep the Israelis out of this fight.” General Schwarzkopf, on the ground in theater, understood that point well. If the Israelis had intervened, he later commented, “we could not have held [the coalition] all together . . . [which] would have made our task much, much more difficult.”¹⁹ Schwarzkopf knew that the SCUD had been “effective as a terror weapon against civilian populations” during the Iran-Iraq War and he and other American policy-makers were justifiably concerned about the political fall-out from the launches against Israel. Just twelve days into the conflict, three high-ranking Israeli military officers, including the deputy chief of staff, General Ehud Barak, requested a meeting with Defense Secretary Richard Cheney and General Powell to inform them that Tel-Aviv wanted to launch “a combined air and ground assault” on Iraq in order to neutralize the SCUD’s. “A daring plan,” an alarmed Powell thought, “but disastrous politics for the coalition.” To avert possible catastrophe, he quickly invited Barak to his office for a “soldier to soldier” talk. Knowing what was coming, Barak minced no words. “These attacks are devastating to the morale of our people. . . ,” he complained.

¹⁸ W. Seth Carus, *Ballistic Missiles in the Third World*, pp. 57, 77, 194.

¹⁹ Colin Powell, *My American Journey*, pp. 776-777; H. Norman Schwarzkopf quoted in Hallion, *Storm Over Iraq*, p. 180.

“If we don’t go in and clear out the SCUD’s, Saddam may use them to deliver chemical warheads . . . They may fire nerve gas or a biological warhead at our cities.” Powell attempted to reassure the Israeli leader and they rejoined the group, but the discussions that day left no doubt. “It was clear to our side that we had to keep Israel out of this war,” Powell later wrote, “and there was only one way: stop the SCUD’s.”²⁰

The United States formed the nucleus around which thirty-four nations united to liberate Kuwait. Given the lessons that Hussein had learned in the Iran-Iraq War, he hoped to repeat his success and terrorize his enemies into a politically favorable end to the conflict, but the SCUD missile ultimately had a minimal impact on the coalition’s military and political stability. Ultimately, the Allies used countermeasures to diminish the terror effects of the SCUD, which contributed to the defeat of Hussein’s Iraq.

Hussein’s efforts this time failed for various reasons. In the Gulf War, he faced a strong coalition of governments, instead of the weakened Revolutionary Islamic regime of Iran. The United States, Great Britain and Saudi Arabia rallied world opinion against Iraq and persuaded the UN to condemn Iraq for its invasion of Kuwait. The United Nations ultimately called for Iraqi withdrawal from Kuwait, authorized member nations to employ “all means necessary” to force Iraq from Kuwait, and imposed an embargo on trade with Iraq. As a result, Hussein’s government found itself isolated in the international community with no ally except the Palestinian Liberation Organization. Whereas Iraq had used the Iran-Iraq War to rally support to its government, the Allied coalition in the Gulf War enjoyed overwhelming public support in its

²⁰ Powell, *My American Journey*., pp. 777-778.

member nations. During the previous war Iran had been the isolated country, while Iraq had received assistance from many nations, including the United States.²¹

Hussein attempted to destabilize the Saudi government of King Fahd from the moment the king invited the United States to defend the kingdom. He argued that the Muslim holy city of Mecca was desecrated by the introduction of Christians and others onto Saudi soil. He also wanted to erode public support for the Saudi Royal family by firing missiles at Saudi Arabia. And Saudi rulers were indeed fearful of missile attacks from Iraq. The day before the war began, Prince Sultan anxiously consulted General Schwarzkopf about the range of Iraq's missiles, revealing his concern about attacks on Riyadh. Schwarzkopf reminded the Prince that SCUD's were inaccurate and that Patriot missiles guarded the city. The Prince then asked if Patriot missiles protected King Fahd's palace. Schwarzkopf replied that he was almost sure that it was.²²

Elements within the Saudi regime did protest that Western military forces were bringing unwanted customs and were a negative influence on the Saudi population. Schwarzkopf pointed out several times in his book that the Saudi Royal family was concerned with the appearance of Western influence within the kingdom, and he imposed several restrictions on religious oriented activities of United States servicemen. In order to minimize the perception of Western and religious influence, Schwarzkopf enforced strict codes effecting holidays such as Thanksgiving and Christmas, the wear of uniforms, and especially the role and conduct of female military personnel while in Saudi Arabia. Schwarzkopf took all of these steps to prevent

²¹ Westwood, *The History of the Middle East Wars* pp. 190-91.

²² Schwarzkopf, *Hero*, p. 409.

pressure within the Saudi government to force the Western coalition members to leave the kingdom. Although Hussein directly threatened Saudi Arabia's security immediately after his invasion of Kuwait, his power to threaten and destabilize the Saudi government was significantly reduced once the Western coalition armies took defensive positions in the kingdom. The Saudi government gained prestige and political muscle by leading the Arab coalition military forces of Egypt, Syria, and Kuwait. The political clout they gained by protecting an Arab neighbor, Kuwait, made up for their allowance on letting non-Muslims into the kingdom. With the Saudi government showing strength and unity of most of the Arab world, Saddam Hussein held little chance of destabilizing the Saudi regime and forcing the Western countries out of Saudi Arabia.

Another reason for Hussein's failure at political terror involved chemical weapons. He used them with impunity against Iran because he knew that Teheran had no such capability. He even threatened that his SCUD's would soon deliver chemical weapons to all cities in Iran. This significant threat ultimately contributed to Iran's willingness to end the war. In the Gulf War, Iraq once again held up the threat of chemical weapons, but the United States countered with a threat to retaliate with nuclear weapons. Secretary of State James Baker informed his Iraqi counterpart, Tarik Aziz, that the United States would respond to any Iraqi use of chemical or biological weapons with "unconventional weapons".²³ This obviously meant employing nuclear weapons against Iraq, since the United States no longer used chemical weapons. Although Hussein vowed to use his SCUD's to "burn half of Israel with chemical weapons," the threat of

²³ Schwarzkopf, *Hero*, pp. 389-90.

American nuclear retaliation deterred him from using this weapon of mass destruction, thus depriving him of the one terrorizing instrument he possessed.²⁴

Hussein fought an eight-year war with Iran, and knew well the strengths and weaknesses of his enemy, which often allowed him to seize the initiative because of Iran's depleted weapons availability. Although Iran's population was ten times that of Iraq's, Iran lacked the weapons to conduct an effective war of attrition. Hussein thought he knew how to defeat the Western members of the coalition in the Gulf War. He understood the United States' aversion to sustaining casualties, the importance of the American media in shaping domestic support for the war, and the Western policy of adhering to the Geneva Convention and striving to avoid civilian casualties. He initially used Western hostages as "human shields" to protect his sensitive military installations until world leaders publicly denounced this tactic. In a public speech on August 21, 1990 he warned that "thousands of Americans will go home shrouded in sad coffins."²⁵ He was clearly playing on American reluctance to sustain casualties borne from the experience in Vietnam. He hoped that a public display of dead and captured American servicemen would weaken American support for the war. Additionally, he used the foreign media within Iraq to publicize the casualties inflicted by the coalition on Iraqi civilians. Hussein needed the propaganda value of SCUD strikes on Israel and relied on the Western media to deliver news of his defiant missile attacks to the world. Hussein needed to show the Arab world, and the Palestinian people, that he would battle Israel as a champion of the liberation of Palestine. He eagerly advocated a Palestinian uprising against Israel that would further entice

²⁴ Ibid., p. 416.

²⁵ Ibid., p. 317.

the “Zionists” to enter the war. As SCUD’s rained down on Israel, media reports showed Arabs in Jordan, Lebanon, and the Israeli Occupied Territories celebrating the terrorizing of Israel. These demonstrations were designed to mobilize Arab sentiment in favor of Iraq and against the United States and its Allied coalition stationed on Arab soil in Saudi Arabia. With the launch of a few militarily insignificant missiles, Hussein knew that he could terrorize Israel and galvanize support in the Arab world for his “Crusade against the Zionists.” Although the missile strikes had limited propaganda value within Iraq (allied bombing destroyed all effective communications), the real value of the SCUD was its effect on the Arab and Palestinian people who longed to defeat Israel. Media organizations such as Cable News Network (CNN) failed to realize that the war against Iraq was fought not only with weapons, but also with propaganda in the Middle East and the world. “The reports by Mr. [Peter] Arnet [of CNN] and others played into Saddam Hussein’s hands, and helped fuel massive demonstrations in the Arab world, particularly among the Palestinians,” Kinzey commented. “This could have destroyed the coalition that President Bush worked so hard to form and keep together.”²⁶ Hussein believed that he could inspire civilian uprisings in Syria, Egypt, and possibly Saudi Arabia against participation in the war against Iraq, which might destroy the coalition and, force the United States and European allies out of Saudi Arabia, and hopefully incite the Arab masses against Israel. There was thus a crude similarity between the goals of Hitler and Hussein: terrorize the civilian population to the point that it might bring sufficient pressure on governments to seek a political solution to the conflict.

²⁶ Kinzey, *The Fury of Desert Storm*, p. 30.

Hussein, however, failed to anticipate the effects of precision-guided munitions and the resulting minimal collateral damage. He also failed to inflict the thousands of casualties he promised. He based his overall political strategy for defeating the Allied coalition on the false assumption that the Western Allies would sustain large numbers of casualties and that he could use the media to portray Iraq as a victim in the war. What he could not have foreseen was the coalition's ability to defend itself against SCUD's and its offensive capability to hunt down and destroy the launchers.

Neither Iran nor Iraq had been able to defend itself against SCUD's in their eight-year war. They had no warning of approaching missiles, no air raid sirens, and no defense against the threat. In order for Hussein's ballistic missile terror to work, he needed the victims to feel defenseless. He believed that if the civilians in Saudi Arabia, and especially Israel, felt imperiled and threatened, they had to respond and he could incite the intervention he desired. Iranian civilians had feared the SCUD attacks so much that they had fled the cities to escape the terror. They felt defenseless and lost faith in their government to protect them. This weakened their morale and their support for the war. Saddam Hussein underestimated the coalition's technological advantages and its ability to neutralize his missiles of terror with offensive and defensive countermeasures.

Unlike any other war since Hitler's introduction of the ballistic missile, the United States and the Allied coalition deployed a missile defense system to prevent Iraqi launches and intercept incoming missiles. In what became known as the "Great SCUD Hunt," the Allies used both offensive and defensive measures to prevent missile launches and to intercept them once they were launched. This effort started with the campaign to establish air supremacy over

Kuwait and Iraq. Next came the destruction of the fixed and mobile missile launching sites followed by continuous fighter-bomber overflights of the SCUD launching areas to destroy the missiles before launching. Once fired, satellites detected the missiles and airborne radar tracked them throughout their flight. The coalition immediately notified the target area to sound the civil defense alert, while Allied aircraft headed for the launch site to destroy the launch vehicles. At the same time, Patriot Surface-to-Air missile batteries scanned with radar to intercept the incoming SCUD's with pinpoint precision. Once SCUD's entered the engagement range of the Patriot, several missiles blasted into the sky to destroy the incoming ballistic missile. Each step of the process involved technological innovation and lessons learned from the effort to interdict the German V-2's from World War II.

The Allied coalition developed an elaborate offensive strategy to prevent missile launches and to destroy the missile launchers. It targeted all known SCUD fixed launch sites, missile storage sites, and production plants on the first night of the air war.²⁷ The attacks destroyed all fixed sites; indeed, the Iraqis never fired a single missile from those locations. This was the same tactic that Allied air forces had used against Hitler by bombing Pennemünde and the fixed launching sites in France. But eliminating the threat from mobile launchers was a different story. Coalition intelligence about the locations of SCUD-related targets prior to the war was admittedly inadequate. General H. Norman Schwarzkopf, the coalition theater commander, noted that, according to pre-war estimates, Iraq possessed forty-eight launchers, a number that intelligence reduced to eighteen just before the air war started. Later in the war,

²⁷ Hallion, *Storm Over Iraq*, p. 179.

however, American analysts raised the estimates to 225 launchers. This lack of accurate targeting information prolonged the SCUD hunt as the Allies devoted more resources to the chase. Once the Allies established air supremacy, the coalition created four “SCUD boxes,” which were airspace control measures over likely launching sites. Coalition fighter-bombers under the control of Airborne Warning and Control (AWACS) aircraft flew constant air patrol over these areas. JSTARS aircraft with side-mounted radar tracked all vehicle movements within the SCUD boxes and directed bombers to attack any Iraqi military targets in them. While F-15 fighter-bombers patrolled high overhead, A-10 tank-killing aircraft patrolled the road network looking for SCUD Transporter, Erector, Launchers (TEL’s).²⁸ Schwarzkopf’s military analysts initially believed that a mobile SCUD launcher required thirty minutes to pack up and move from the launch site after firing a missile. He was surprised when his Egyptian allies, who used SCUD’s, informed him that the TEL’s could pack and move within six minutes. This explained why fighter-bombers who rushed to a mobile launch site frequently found no target there. “I knew we had a big problem with any remaining mobile launchers,” Schwarzkopf noted on January 17, 1991, “the squat, eight-wheeled vehicles, roughly the size of large gasoline tanker trucks, would be devilishly hard to find.”²⁹ The mobile SCUD TEL’s eluded the Allied air force until the end of the war.

The Special Operations teams were the secret, unsung heroes of the SCUD hunt who went deep into Iraq in search of the TEL’s before they could fire their missiles. They maintained surveillance of the roads in and out of suspected TEL hiding locations, primarily residential

²⁸ Bert Kinzey, *The Fury of Desert Storm: The Air Campaign*, pp. 130-131.

²⁹ Schwarzkopf, *Hero*, pp. 417, 419.

neighborhoods and under highway overpasses, and radioed priceless intelligence to orbiting AWACS aircraft. One observer team discovered twenty-nine SCUD TEL's preparing to launch a final barrage at Israeli cities on February 27, 1991 and called in A-10 attack aircraft, which destroyed the SCUD's and launchers. "Thanks for keeping Israel out of the war," Secretary of Defense Richard Cheney reportedly said to the airman after the war.³⁰

Although the Allies never fully suppressed the mobile SCUD's, their efforts against them paid important dividends. The primary effect of the offensive SCUD hunt was that it drastically reduced the number of launches. During the first ten days of the war, Iraq fired an average of five SCUD's per day. This peaked with ten missiles launched on Day 9 of the war. For the remaining thirty-three days of the war, Hussein averaged one SCUD launch per day.³¹ The missile was inaccurate to begin with – "If these SCUD's [sic] struck within two miles of a target, it was considered a hit," commented General Colin Powell, chairman of the Joint Chiefs of Staff during the conflict – and Allied attacks further degraded its accuracy. Once the coalition patrolled these pre-planned launch locations, the TEL's avoided these sites and fired missiles haphazardly from unsurveyed positions. The last two SCUD's launched at Israel landed in the empty desert away from any cities, and one of the missiles had a concrete warhead.³² Iraqi missile crews typically had little time to run from their hiding places, set up and fire a missile, and scurry for cover again before being engaged by coalition aircraft. They had not faced the threat of immediate destruction from opposing air forces during the Iran-Iraq War, and neither had the German V-2 missile crews. Never before in warfare had ballistic missile crews faced an

³⁰ Hallion, *Storm Over Iraq*, pp. 183-184.

³¹ Kinzey, *The Fury of Desert Storm*, p. 131.

³² Colin Powell, *My American Journey*, p. 776; Hallion, *Storm Over Iraq*, p. 183.

immediate threat from enemy forces. The SCUD hunt decreased the number of SCUD launches through attrition and prevention, and it decreased the accuracy and terror effects of these ballistic missiles.

The Allied coalition also conducted a defensive component of the SCUD hunt. Immediately upon their launch, two early warning satellites orbiting above the Middle East detected SCUD's. "The political, psychological, and military value of providing early warning was incalculable," the commander of the United States Air Force (U.S.A.F.) Space Command stated after the war. "These systems provided warning to threatened countries and served to contain the conflict."³³ These satellites down-linked the SCUD information to Space Command in the United States and Central Command in Saudi Arabia. They immediately relayed this information to AWACS, JSTARS, all major military commands in theater, and politically sensitive allies, including Israel. This initiated the civil defense preparations in the targeted cities and provided time for people to seek shelter and for defensive countermeasures, such as the deployment of Patriot missiles, to track and intercept the inbound missiles. The two missile warning satellites provided nearly five minutes of warning time to Patriot crews, which enabled them to prepare their anti-ballistic missile interceptors.

For the first time in history, the Allied coalition used a defensive missile to intercept and destroy an incoming ballistic missile. The Patriot, which was originally designed as an anti-aircraft weapon, was adapted to shoot down ballistic missiles targeted at key cities and military targets. Its success, more than any other measure, limited the intended effects of Hussein's

³³ Hallion, *Storm Over Iraq*, p. 181.

terror missiles. Hussein launched seven SCUD's at Tel Aviv on the second night of the Gulf War, which terrorized Israeli civilians. On the same night, four Patriots intercepted a SCUD launched at Dhahran, Saudi Arabia.³⁴ Israel had refused Patriots from the United States prior to the war, but this demonstrated effectiveness of the anti-ballistic missile system prevented Israel from retaliating against Iraq. As a condition for Israeli agreement not to retaliate against Iraq, the United States immediately shipped thirty-two Patriots and their crews to Israel.³⁵ Throughout the remainder of the war, those Patriot missiles successfully intercepted all threatening SCUD's fired at that country. The Patriot system allowed SCUD's to crash into the sea or desert if they posed no threat to civilians. The "SCUD buster" had a valuable psychological impact on the people it protected.

The Allied engagement doctrine for the Patriot missile was to fire at least two missiles at threatening SCUD's and to allow non-threatening ones to explode harmlessly into the Persian Gulf or the desert. Of the ninety missiles fired at Saudi Arabia and Israel, American crews determined that forty-seven were threatening and fired 158 Patriots to intercept them. Initial analysis showed that Patriots intercepted forty-five of those forty-seven SCUD's for an engagement success rate of 96 percent.³⁶ It is worth noting, however, that after the war a debate developed over the effectiveness of the intercepts in destroying the SCUD warheads and whether or not the SCUD and Patriot debris had caused as much damage as the SCUD warhead would have. The psychological effects of the Patriot elevated Allied and Israeli morale and neutralized Hussein's attempt to terrorize them into a political settlement of the conflict.

³⁴ Schwarzkopf, *Hero*, p. 416.

³⁵ Hallion, *Storm Over Iraq*, p. 180.

³⁶ *Ibid.*, p. 185.

Hussein fired six SCUD's against Riyadh, Saudi Arabia, the location of the Allied military headquarters and King Fahd's palace. Patriots engaged and destroyed all six SCUD's in a spectacular display of technological achievement. These intercepts showed that the coalition could defend its military forces and civilian populations against ballistic missiles, thus removing a primary objective for terrorism. One unengaged SCUD did, however, strike a barracks in Dhahan when the Patriot battery protecting it was down for maintenance. Twenty-eight Americans died and ninety-seven were wounded in this one attack. "It was a terrible tragedy," Schwarzkopf said about the attack, "this terror weapon launched into the sky that by sheer fate happened to fall where we had a concentration of troops."³⁷ This one SCUD caused one-quarter of all American deaths and one-quarter of all American wounded from enemy action in the entire war. Hallion calculates that, based on casualty figures from the Iran-Iraq War, without the SCUD hunt and the Patriot success, military and civilian casualties would have reached as many as 6000, including 1300 deaths.³⁸ Allied countermeasures had a profound impact on the SCUD's inability to terrorize its intended victims, but the SCUD launches also caused a shift in Allied military strategy.

Prior to the start of the Gulf War, Schwarzkopf believed that his Phase I of the air campaign, including the elimination of the SCUD threat, would be completed in six days.³⁹ He states that fully one-third of all Allied strike aircraft were diverted to SCUD hunting duties. The start of the ground attack phase of the war was delayed by eight days because aircraft and assets assigned to other tasks were redirected to the SCUD hunt. The Air Force Chief of Staff,

³⁷ Schwarzkopf, *Hero*, pp. 460-461.

³⁸ Hallion, *Storm Over Iraq*, pp. 185, 187.

³⁹ Schwarzkopf, *Hero*, p. 421.

General Merrill “Tony” McPeak, said after the war that about three times the effort was put into the SCUD hunt than was originally planned.⁴⁰ The mobile SCUD TEL’s drained coalition resources from the immediate task of defeating Iraq’s Air Force, air defense and strategic command and control infrastructure. The political ramifications of not seeking and destroying the militarily insignificant SCUD’s would have been that Israel would have entered the war, thereby upsetting the geopolitically diverse coalition. If the SCUD’s had been able to extend the air war another week, the ground war phase would have been pushed perilously close to the start of Ramadan in March 1991. Schwarzkopf and his Saudi counterpart, General Bin Sultan al-Saud Khalid, each had concerns about the possibility of not fighting during this holy month.⁴¹ Hussein’s use of SCUD’s also caused the coalition to expend vast amounts of political energy to keep Israel out of the war, and the Arab members in it. He benefited from the propaganda effect of missile strikes against Israel within the Palestinian community, which in turn caused the coalition members to focus attention on the Israeli-Palestinian conflict. Hussein used the veiled threat of chemical weapons, delivered by SCUD’s, as a tool to weaken the resolve of coalition members. Just as in World War II against V-2’s, the mobile SCUD hunt drained military resources from the primary tasks, which lengthened the war. Ultimately, Hussein failed to affect the military or political outcome of the war through the use of ballistic missiles. He had nothing to lose in using his SCUD’s in the same successful manner as he did in the Iran-Iraq War. Could Hussein’s gamble have ended the war by attacking Israel and splitting the coalition?

⁴⁰ Kinzey, *The Fury of Desert Storm*, p. 130.

⁴¹ Schwarzkopf, *Hero*, p. 369.

Hussein believed that Arab countries would rally to his side if Israel attacked Iraq. Hallion argued that, “the coalition’s Arab states clearly recognized the danger to regional stability posed by Saddam Hussein’s regime.”⁴² The U.S. Secretary of State, James Baker, consulted with the Saudi King Fahd in November 1990 about the possibility that Israel could get involved in the war. King Fahd stated that Arab forces would not allow themselves to be perceived as allied with Israel. He also stated that if Israel defended itself, Saudi Arabia would still fight by the United States’ side.⁴³ The king recognized Israel’s right to self-defense, even if that meant a limited strike against Iraq. King Fahd then used his influence within the Arab coalition members to assure them that a limited Israeli self-defense response should not have an effect on the Allied coalition. This political maneuvering, unknown to Saddam Hussein, would likely have held the coalition together even with an Israeli attack.

Israel had retaliated militarily for every attack on its soil since 1948. With that unflinching record, Hussein certainly expected that Israel would be dragged into the conflict. On the morning of January 18, 1991, Iraq launched seven SCUD’s against Tel Aviv, Israel which caused light damage and no Israeli deaths. The Israeli Air Force scrambled dozens of retaliatory aircraft to strike at Iraq, but they never left Israeli airspace. General Colin Powell reported to Schwarzkopf that President George H. Bush had persuaded Israel not to strike at Iraq.⁴⁴ The Israeli Air Force later requested, and was denied, access to the IFF transponder codes used in Allied aircraft to Identify Friend or Foe aircraft operating over Iraq. They needed these codes to safely enter and exit Saudi and Iraqi airspace for a strike without being

⁴² Hallion, *Storm Over Iraq*, p. 180.

⁴³ Schwarzkopf, *Hero*, p. 373.

⁴⁴ *Ibid.*, p. 417.

intercepted by coalition F-15s.⁴⁵ After another night with three more SCUD's launched against them, the Israeli government requested overflight clearance for two 100-plane raids into Iraq followed by Apache helicopter strikes and commando raids launched through Saudi airspace. President Bush telephoned Israeli Prime Minister Yitzhak Shamir and dissuaded an Israeli military response based on three arguments: the Allies had already destroyed all known SCUD launch sites, the Allies would continue attacking with more aircraft and resources than Israel, and Israeli intervention could fracture the coalition.⁴⁶ Thus, political pressure from the United States persuaded Israel not to enter Hussein's gamble.

Saddam Hussein successfully employed SCUD ballistic missiles in his eight-year war with Iran. He wore down the politically weak Islamic Revolutionary regime by terror bombing, use of chemical weapons, and finally terror strikes with missiles. He learned that ballistic missile terrorism could destabilize governments, and panic a civilian populace into fleeing their cities in Iran. He hoped to destabilize the coalition arrayed against him in the Gulf War by enticing "Zionist" forces into the conflict and by threatening the Saudi royal family into suing for a peaceful settlement. He clearly was not effective in his ambition to split the coalition, although his attempt to exploit pre-existing animosities and friction among members of the coalition are reminiscent of Hitler's attempt to isolate nations during World War II. The Allied attempts to interdict the SCUD launches were similar to the attempts against the V-2's, although improved technology, such as early satellite warning, airborne command and control, air supremacy and effective communications with Special Operations forces, made SCUD hunting much more

⁴⁵ Hallion, *Storm Over Iraq*, p. 180.

⁴⁶ Schwarzkopf, *Hero*, pp. 417-418.

successful. The radical new capability that ultimately defeated Hussein's terror designs was the Patriot, the first anti-ballistic missile. The new weapon greatly improved Allied morale in the face of SCUD attacks by preventing countless casualties and a feeling of helplessness in the targeted civilians. Once the coalition destroyed his air force, his air defense network, and his command and control infrastructure, Hussein relied on his only offensive weapon available, the SCUD missile. Like Hitler before him, Hussein had reached the point of desperation in a losing cause. The SCUD, an improved version of the V-2, once again terrorized civilians, even with its small warhead and relative inaccuracy. Hitler developed the first ballistic missile, but Hussein purchased his SCUD's from the former Soviet Union. The spread of missile technology and proliferation of missiles poses a threat to nations around the world as leaders seek terror missiles. Missile proliferation currently threatens the United States' security as rogue nations export missiles of terror.

CHAPTER 4: PROLIFERATION OF TERROR

A summary of the most recent missile proliferation issues, with an emphasis on who is buying, who is selling, and why this is relevant is needed to understand today's proliferation of terror missiles. With the terrorist strikes of September 11, 2001 perpetrated so recently, the emphasis is on potential ballistic missile threats posed to the United States and its allies in the war on terror. With hijacked planes becoming terrorist weapons, the threat of ballistic missile strikes from rogue nations are certainly possible against the United States and its allies. The breakup of the former Soviet Union has led to a loosening of the previous proliferation constraints as more nations seek power and status as missile-capable states. Additionally, the mating of Weapons of Mass Destruction (WMD) warheads with these missiles elevates the potential destructive capability of the once militarily insignificant weapons. With the United States' demonstrated ability to intercept ballistic missiles, nations are now seeking WMD capabilities to regain the deterrent value of their missile forces. As missiles become more accurate, easier to manufacture, and easier to employ, they are attractive alternates to a front-line air force. It is also important to examine who is primarily being targeted with missiles and why. Regional conflicts, deterrence, prestige, and preservation are all factors that weigh on nations seeking missile technology. This spread of missile technology, combined with global terrorism, presents a challenge to the United States and its allies throughout the world.

There are currently nine countries known to have indigenous missile production facilities that potentially threaten the United States and its allies. These are China, India, Iran, Iraq, Libya, North Korea, Pakistan, Russia and Syria. Other countries with ballistic missile

production, currently friendly to the United States include France, Israel, Taiwan, Argentina, Japan and South Korea.¹ The threatening nations can be further broken down into three regions, and four defined conflicts. The Middle East region consists of Iran, Iraq, Libya and Syria, and their enemy, Israel. The Middle Eastern region consists of India and Pakistan, with their conflict over the disputed state of Kashmir. The Far Eastern region consists of China, and its dispute with its “break-away” province Taiwan, and the ongoing dispute between North and South Korea. The influence of Russia, and its missile sales proliferation, continues to be a factor throughout these regions. Discussion will cover these regions, the ballistic missile proliferators in each, and the significance of their missiles. While the list of missile producers is relatively small, many more countries, within these regions, *possess* ballistic missiles, which is significant as well. Because of the war on terror and the Israeli-Palestinian conflict, the Middle East region is currently the most contentious in the world.

Prior to the Gulf War in 1991, Iraq possessed the most advanced threatening ballistic missiles in the Middle East. Due to its extensive missile development program during the Iran-Iraq War, Iraq developed advanced versions of the SCUD-B capable of reaching deep into Iran. Iraq purchased 350 SCUD-Bs in 1984 and another 300 in 1986 from Russia.² Iraq modified these missiles and extended its 200-mile range to over 400 miles with the Al-Hussein, and 559 miles with the Al-Abbas. The terms of the Gulf War cease-fire stipulated that Iraq destroy all nuclear, biological, and chemical weapons, as well as all missiles with a range greater than 94 miles. However Iraq is suspected by former U.N. inspectors to possess as many as 40

¹ Jack Spencer, *The Ballistic Missile Threat Handbook*, p. 2.

² *Ibid.*, p. 39.

SCUD derivative missiles, hidden throughout the country. Hussein forced all U.N. weapons inspectors to leave Iraq in December 1998, and there have been no verification inspections since then. The Rumsfeld Commission reported that, "Iraq has maintained the skills and industrial capability needed to reconstitute its long range ballistic missile program."³ Prior to the Gulf War, Iraq initiated and funded the Condor missile joint development program with Argentina.⁴ Although halted by United States pressure in 1993, Iraqi scientists undoubtedly gained valuable experience and knowledge and could restart this effort, if not prohibited by U.N. inspectors.⁵ Hussein is currently developing two missiles authorized by the cease-fire, the short range Al-Samoud and the Ababil-100. According a 1997 C.I.A. report, "Iraq could convert both of these programs into development of longer-range missile systems after economic sanctions are lifted and U.N. inspections cease."⁶ There is currently no way to verify Iraq's compliance with the cease-fire agreement and the progress of its secret ballistic missile program. The United States intelligence community does not believe that Iraq currently has long-range ballistic missile capabilities, but that Hussein would most likely purchase North Korean components, technology, and actual Taepo-Dong-2 missiles to restart his missile program.⁷

However, Iraq's hatred of Israel and the lingering animosity from the Iran-Iraq War have undoubtedly fueled a renewal of the Iraqi missile program.

³ Donald H. Rumsfeld, *Executive Summary, Report of the Commission to Assess the Ballistic Missile Threat to the United States*, p. 8.

⁴ Janne Nolan, *Trappings of Power: Ballistic Missiles in the Third World*, p. 56.

⁵ Spencer, *The Ballistic Missile Threat Handbook*, p. 43.

⁶ Director of Central Intelligence, *Report of Proliferation – Related Acquisition in 1997*, p. 4.

⁷ National Intelligence Council, *Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015*, p. 8.

Iran, which purchased its first SCUD ballistic missiles from Libya and Syria in 1985, has continued to improve on the SCUD design and now has a formidable missile development program. The Rumsfeld Commission reported that Iran's ballistic missile infrastructure is now more sophisticated than North Korea's, due to long term assistance from Russia and China.⁸ Iran considers Iraq to be the primary threat to its security, and developed its missiles in part because Iraq used them successfully in its eight-year war. Iran is known to have six different short-to-medium range domestically produced and deployed ballistic missiles. Four of these are SCUD derivatives developed through assistance from North Korea and China. The other two are reversed engineered versions of the Chinese M-9 and M-11 ballistic missiles, which are versions of the Soviet Union's SS-4 and SS-5 missiles.⁹ Missile technology transfers from North Korea and China have given Iran a distinct advantage over its primary adversary, although it is not clear what its further intentions may be for this extensive missile program. Iran is expected to continue development of its already tested Shahab-3 missile, and it may be close to testing a variant based on North Korea's Taepo Dong-1 missile.¹⁰ Iran's predominant missile systems currently threaten its geographic neighbors Iraq, Afghanistan and Pakistan. However the M-11 threatens areas as far away as Saudi Arabia and Syria. Once it is fully deployed, the Shahab-3 missile will be capable of reaching Turkey and Israel.¹¹ Iran has developed its missiles to become a regional military power, and is now seeking to extend its influence through missile technology.

⁸ Rumsfeld, *Executive Summary*, pp. 12-13.

⁹ Spencer, *The Ballistic Missile Threat Handbook*, p. 35.

¹⁰ National Intelligence Council, *Foreign Missile Developments*, p. 14.

¹¹ Spencer, *The Ballistic Missile Threat Handbook*, p. 36.

Syria purchased its first SCUD ballistic missiles from the Soviet Union in the 1970s and later bought SCUD, M-9 and M-11 missiles from China. All of its missiles can reach Israel. A United States Department of Defense report in 1997 stated that “Syria believes that its chemical and missile forces act as deterrents against Israeli attacks.”¹² During the 1982 Lebanon War, Syria lost eighty-two fighter aircraft to none against the Israeli Air Force.¹³ Given its difficulty in penetrating Israeli air space, Syria has invested in a missile force more capable of striking Israel. More importantly, Syria has signaled this intention to Israel in order to reinforce the deterrent effect.

Libya has the distinction of being the first country to fire a ballistic missile targeted at a United States military installation. In response to the United States’ bombing of Libya for its role in the terrorist attack in Berlin in April of 1986, Libyan leader Colonel Gaddafi fired two SCUD-B missiles at a military installation on the Italian Island of Lampedusa. The inaccurate missiles fell short in the sea, with no effect.¹⁴ This action shows that he is not hesitant to fire a missile at the United States, or any one else. This use of missiles was a defiant strike with no other purpose than revenge. Libya initially purchased SCUD’s from the Soviet Union in the 1970s and is attempting to develop domestic production of the medium range Al Fattah missile, which could threaten Israel.¹⁵ Libya’s ballistic missile program has been significantly curtailed by a United Nations embargo imposed for its alleged involvement in the bombing of a Pan Am flight that crashed at Lockerbie, Scotland. Libya has reportedly sought outside technological

¹² Ibid., p. 65.

¹³ W. Seth Carus, *Ballistic Missiles in the Third World*, p. 30.

¹⁴ Ibid., pp. 53-54.

¹⁵ Spencer, *The Ballistic Missile Threat Handbook*, p. 45

assistance from Serbian and German firms and engineers.¹⁶ Libya's intentions for its missiles are unclear, since no threatening country is within range of its missile systems. Development of its Al Fattah missile could threaten Israel, but currently the main threat of Gadaffi's missiles is the proliferation they may cause by sales to other nations in the region.

Other potential threats in the Middle East are ballistic missiles located in Egypt, Saudi Arabia, Yemen and the United Arab Emirates. Egypt has an arsenal of SCUD-B missiles capable of reaching Israel, and it fired three of them during the 1973 war with no effect. Egypt is believed to be involved in a joint missile development program with North Korea, which may lead to a No Dong variant in Egypt. This would have the strategic implication of threatening the entire Middle East. Yemen purchased its SCUD-B missiles from the Soviet Union and poses little threat to United States interests. However since the U.S.S. Cole bombing occurred in a Yemeni port, and U.S. Special Forces are currently waging war in Yemen, it is possible that terrorist forces in Yemen could acquire SCUD's and launch them at American interests in the region. The United Arab Emirates is currently allied with the United States and, although it possesses SCUD missiles, it is not seen as a threat to American interests.

Saudi Arabia is unique among this list of Middle East countries because it purchased its DF-3 missiles from China. Immediately after Iran used SCUD's purchased from Libya in the Iran-Iraq War, Saudi Arabia requested to purchase the U. S. - made Lance missile as a deterrent. The United States refused, so Saudi Arabia purchased as many as 60 missiles, to counterbalance the threat that Iran posed to the kingdom.¹⁷ Although these were the least

¹⁶ Ibid., p. 46.

¹⁷ Carus, *Ballistic Missiles in the Third World*, pp. 4-7.

accurate missiles in the Middle East, they provided Saudi Arabia with a political and strategic deterrence, and a measure of prestige throughout the region.

Israel is the target, surrounded by all these missile-capable countries. Out of self-defense and deterrence, Israel maintains its Jerico missile program primarily as a balance to Syria's arsenal of missiles and Syria's indirect aggression against Israel through its support of the Hizbollah organization in Lebanon. With the United States' technological assistance, Israel's missiles have a qualitative advantage over its Arab adversaries.¹⁸ The Jerico missiles have the range and accuracy to strike every threatening country in the Arab world, which may have prevented the escalation of Middle Eastern conflicts into ballistic missile terror attacks.

The current missile race between India and Pakistan poses little direct threat to the United States and its allies' interests. However, the escalation of tensions between the two rivals could not only draw the United States in to mediate, but might also weaken Pakistan's recent support for the war on terrorism. Also, Pakistani President Musharraf came to power in a coup, and he has many factions within the country, including his intelligence service and Al Qaeda cells, which threaten to destabilize his regime. It is impossible to predict what would happen to Pakistan's ballistic missile inventory should another, more radical, dictator overthrow Musharraf's unstable government. Pakistan's rapid missile development program is due mainly to technology, systems and production facilities provided by China and North Korea.¹⁹ Pakistan's missile arsenal includes domestic derivatives of SCUD missiles, Chinese M-9, and the North Korean No-Dong missile. The Gauri-2 is a medium range ballistic missile based

¹⁸ Nolan, *Trappings of Power*, pp. 75-77.

¹⁹ Spencer, *The Ballistic Missile Threat Handbook*, p. 55.

directly on the Taepo Dong-1 and it can reach all of the Middle East, as well as India and Western China.²⁰ In 1998-99, Pakistan and India participated in a series of provocative missile tests designed to intimidate the other side, and demonstrate a balance of ballistic missile capability for deterrence.

India has a clear superiority not only in ballistic missiles, but also in conventional and unconventional weaponry over Pakistan. India's ambitions, however also stretch northward toward China.²¹ India's Agni-2 missile has the capability to strike all of Pakistan and China. Jack Spencer of the Heritage Foundation states, "(India's) prime antagonist is Pakistan, though India's marred past with China contributes to its desire to field ballistic missiles."²² The Rumsfeld Commission report said of this arms race; "India and Pakistan are not hostile to the United States . . . However, beyond the possibility of nuclear war on the sub-continent, their aggressive, competitive development of ballistic missiles and weapons of mass destruction poses three concerns in particular." These concerns were continued proliferation of missile technology, closer ties to Russia, North Korea and China, and their capabilities might upset the regional balance and affect the United States role in stabilizing Asia.²³ Although it is likely that both India and Pakistan will continue to escalate their ballistic missile capabilities, India's further goal is to establish a deterrent force to match the Chinese missile capability to the North.

China's missile inventory is too large and capable to discuss here. China's intentions for its missiles are critical to the balance of power throughout the world. China is a significant exporter and proliferator of ballistic missile technology throughout the third world. China sold

²⁰ Ibid., pp. 55-58.

²¹ Nolan, *Trappings of Power*, pp. 88-89.

²² Spencer, *The Ballistic Missile Threat Handbook*, p. 30.

SCUD missiles to many nations in the Middle East, Iran, Pakistan and North Korea. It also provided the technology to upgrade those missiles and then sold its M-9 and M-11 missiles to several countries. Its sale of DF-3 missiles to Saudi Arabia was a destabilizing event in the balance with Israel, until Israel understood their small number and inaccuracy. China has been involved in significant ballistic missile technology transfer and is under constant United States pressure to curb its spread of these weapons. The Cox Committee report outlines evidence that China has stolen U.S. missile guidance technology and information on the United States' most advanced thermonuclear weapons.²⁴ As stated earlier, China has also shared missile technology with Iran, Libya, North Korea, Pakistan and Saudi Arabia. China is a threat to the United States, not only for its theft of military secrets, but also from its proliferation of missile technology and systems.

China's overt threat to American allies and interests is its continuing conflict with the breakaway province, Taiwan. China has used its deployment of missile systems and tests to terrorize the Taiwanese government and people. According to the Rumsfeld report, "China's 1996 missile firings in the Taiwan Strait, aimed at intimidating Taiwan in the lead up to its presidential election, provoked a sharp confrontation with the United States."²⁵ China continues to position ballistic missiles within range of Taiwan, with the latest intelligence estimates at 350-400 missiles. Bill Gertz wrote recently in the Washington Times, "The Pentagon took steps to update its war plans to defend Taiwan last year after President George W. Bush announced that

²³ Rumsfeld, *Executive Summary*, p. 10.

²⁴ U.S. House of Representatives, *Report by the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China (Cox Report)*, Vol.1, p. 173.

²⁵ Rumsfeld, *Executive Summary*, p. 6.

the United States would do ‘whatever it takes’ to defend the island against mainland attack.’²⁶ He also states that Chinese missile deployments, most recently the CSS-7 short-range missile, continue opposite Taiwan at a rate of 50 missiles a year. These new deployments may persuade the Bush Administration to sell Aegis warships to Taiwan. China currently poses a direct ballistic missile threat to the United States and its allies.

This threat, however, is being overtaken in importance by North Korea’s expanding ballistic missile program and its emerging capability to launch ballistic missiles against the United States. Currently, North Korea poses the greatest ballistic missile threat to the United States both through proliferation and its threat to South Korea and Japan. President Bush presently identifies North Korea as a member of the “axis of evil” for its role in the spread of terrorism. North Korea’s leader Kim Jong Il has supported his regime through missile technology exports and agreements such as the 1994 “Agreed Framework” with the United States, Japan and South Korea to halt its nuclear power program in exchange for fuel oil, food and safe nuclear power plant construction. North Korea’s 1998 test of their three-stage Taepo Dong demonstrated its capability to hit targets in the Alaskan Aleutian Islands. According to the National Intelligence Council, a two-stage Taepo Dong-2 missile recently tested by North Korea could deliver a payload to Alaska and Hawaii, while a three-stage version could strike anywhere in the United States.²⁷ Senior United States intelligence officials believe that North Korea may increase its No-Dong exports to Syria, Pakistan and Libya.²⁸ North Korea is producing medium and long-range missiles for export, apparently in an attempt to secure hard

²⁶ Bill Gertz, “China Assembles Missiles Near Coast Facing Taiwan,” Washington Times, 4/2/2002.

²⁷ National Intelligence Council, *Foreign Missile Developments*, pp. 7-8.

²⁸ Spencer, *The Ballistic Missile Threat Handbook*, pp. 50-51.

currency for its failing economy. The NIC report also concluded that “the proliferation of medium range ballistic missiles (MRBM)- driven primarily by North Korean No Dong sales – has created an immediate, serious and growing threat to United States forces, interests, and allies, and has significantly altered the strategic balance in the Middle East and Asia.²⁹ Although North Korea does not require ICBMs to wage a regional conflict with South Korea, in any all-out conflict with South Korea it would likely target United States forces stationed throughout Japan, Okinawa, and even Alaska and Hawaii. North Korea could cause significant damage to all South Korean and Japanese military installations, while its longer-range missiles could act as a deterrent to retaliation. The North Korean test in August 1998 launched a missile directly over the Japanese mainland, which landed off the Aleutian Island chain. This was a direct threat not only to Japan, but also to the United States. This provocative act was designed to terrorize the Japanese people by demonstrating the power of the North Korean military and exposing the vulnerability of the Japanese mainland. The North Korean communist regime sees its missile program as a symbol of power, a source of foreign hard currency and investments, deterrence against its adversaries, and a tool for coercive diplomacy. With each new missile launch, North Korea seemingly seeks concessions such as grain shipments from the United States, to assert its role as a dominant regional power.

Russian missiles, proliferation and technology transfer continue to pose a significant threat to the United States. Russia has the most extensive ballistic missile arsenal facing the United States and its allies. Although the former Soviet states are “friendly” towards the United

²⁹ National Intelligence Council, *Foreign Missile Developments*, p. 14.

States, there is still distrust and animosity between the two countries as the United States pursues a new National Missile Defense system and signaled its intention to withdraw from the 1972 Anti-Ballistic Missile Treaty. Russia poses a threat through its political instability and the aging condition of its missile forces. Radical elements in such former Soviet republics as Georgia could seize control of ballistic missiles and target the United States or its allies with little warning. If Russia's economic condition deteriorates further, the government may be tempted to sell advanced missile technology for foreign currency.

Unemployed former Soviet missile technicians are known to be working for missile programs in Iran, Iraq and India.³⁰ This adds to the already expanding proliferation problem and undermines diplomatic efforts to limit the increasing threat of ballistic missile terror. Findings of the Rumsfeld Commission report conclude, "Russia poses a threat to the United States as a major exporter of enabling technologies, including ballistic missile technologies, to countries hostile to the United States. In particular Russian assistance has greatly accelerated Iran's ballistic missile program."³¹ The Commission also concluded that the principal cloud over Russia is that of political uncertainty, and that the risk of an unauthorized or inadvertent launch against the United States would increase sharply if the political situation in Russia deteriorated. The proliferation of ballistic missiles and the threat would not be as frightening or significant without the threat of Weapons of Mass Destruction as warheads for these missiles.

A ballistic missile's destructive capabilities are significantly enhanced once it is armed with chemical, biological or nuclear warheads. "I am sure Hitler would not have hesitated,"

³⁰ Director Central Intelligence, *Report of Proliferation*, p. 6.

³¹ Rumsfeld, *Executive Summary*, p. 5.

Albert Speer noted, “to use atom bombs against Britain.”³² Once a country has a ballistic missile arsenal, and WMD capability, it possesses a terrifying threat of mass destruction of either civilian or military targets. The terror effect of Iraqi SCUD launches in the Gulf War was significantly enhanced by the *threat* of chemical warheads. In the case of India and Pakistan, both countries possess missiles with nuclear capability and each country must assume that any missile launched by its adversary would be nuclear capable. In this case, neither side would launch such a missile, because of the understanding of Mutually Assured Destruction that each country would endure in a nuclear exchange. With the list of missile and chemical capable adversaries growing, the United States has publicly stated the government’s intent to respond to any enemy’s use of WMDs with nuclear weapons. This deterrent will work until that enemy possesses the capability to threaten the United States with mutually assured destruction. China’s threat against Taiwan is not enhanced by the threat of chemical or nuclear warheads because of the death and destruction those weapons would cause. The island would be uninhabitable and neither side would gain from the missile exchange. Within the Middle East, Israel’s nuclear-armed Jerico missiles are balanced with Syria’s chemically-armed SCUD’s. This balance of assured destruction should prevent the use by either of these missiles in all but the worst case scenario. Iraq’s Hussein has threatened Israel with the use of his chemical weapons should Israel employ nuclear weapons against Iraq.³³ Nolan also notes that Iran’s possession of chemical weapons raises the possibility of irrational or unplanned use in the highly volatile region where “control of military forces is uneasy and weapons may be diverted to

³² Albert Speer, *Inside the Third Reich*, p. 271.

³³ Nolan, *Trappings of Power*, p. 85.

terrorist or sub-national groups.’³⁴ This mutual destruction deterrence only works until one side believes they have an advantage over the other that would outweigh the risks. If countries such as Iran, Iraq, Libya or Syria feel they could overwhelm Israel with a surprise missile attack, without losses to themselves, they may be tempted to consider a preemptive first strike.

North Korea’s testing of a three-stage missile capable of hitting the United States is militarily irrelevant when it is armed with an explosive warhead. The capability to hit Los Angeles with a 1600-pound warhead would not terrorize the populace, unless North Korea could launch several hundred at once. Incredibly, even Hitler understood this concept in 1943. Without the threat of WMD warheads, a missile possesses little terror value against the United States. The greatest advantage that a country gains with the possession of WMD is through diplomatic and political coercion, using missiles as an unstoppable delivery vehicle. WMD capable missiles are seen throughout the world as a symbol of power and a guarantee of national security through deterrence.

In October 2001, President Bush identified three countries in his “axis of evil” speech: Iran, Iraq, and North Korea. All three of these countries possess ballistic missiles, weapons of mass destruction, and are proven supporters of terrorism. Iraq has restarted its chemical and biological weapons production, and has attempted to purchase nuclear material through foreign suppliers, in Russia, since it expelled the United Nations inspectors in 1998. Hussein has also retained as many as 40 undetected SCUD missiles, and has also restarted his domestic ballistic

³⁴ Ibid., p. 86.

missile production.³⁵ Iraq has reportedly supported homicide bombings in Israel and supports terrorism against the United States.

Iran has the most advanced ballistic missile program in the Middle East, has a known chemical-biological capability, and received support for its nuclear program and its Bushehr reactors from Russia.³⁶ It has also been implicated in a shipload of weapons bound for the Palestinian Authority that Israel intercepted. This overt shipment of arms to the Palestinians and Iran's financial and military backing of the terrorist organization Hizbollah has solidified Iran as a primary threat to the United States and its allies.

North Korea, through its terrorist missile launch over Japan, its chemical, biological and covert nuclear weapons program and its threat to South Korea, became the third member of the "axis of evil." All three members have totalitarian governments with total control of their populations, media and excessive military capabilities. Each possesses ballistic missiles and has launched them at adversaries to terrorize civilians. Prevention of these missile systems as weapons of terror is a primary concern as the United States begins its war on terrorism.

³⁵ Spencer, *The Ballistic Missile Threat Handbook*, p. 40.

³⁶ Carol Giacomo, "Albright says U.S. May Cut Russia Aid Over Iran Missile", Reuters News Service, 12/09/1998.

CHAPTER 5: STOPPING THE TERROR

Hitler's V-2 was the first ballistic missile used in warfare. Although it was insignificant from a military point of view due to its small warhead, limited range and inadequate quantities, it did serve Hitler's purpose as a terror weapon against civilians. His intent was to terrorize the British civilians into capitulation. The SCUD missile was equally insignificant as a military weapon in the Gulf War, nearly half a century later. The SCUD attacks failed to break the spirits of civilians in Tel Aviv and Riyadh just as the V-2 failed to collapse civilian morale in London. Politically, however, the SCUD achieved some measure of success because of the political and diplomatic effort the coalition expended to prevent the intervention of Israeli forces. Saddam Hussein received worldwide media attention as his SCUD's struck out at American and Zionist forces. Hussein hoped to repeat his success from the Iran-Iraq War when he demoralized a terrified Teheran populace and destabilized a weak government into suing for a political settlement to the war. Both authoritarian leaders attempted to achieve a political victory by using missiles of terror. Just as Hitler underestimated the strength of the British people and Winston Churchill, Hussein underestimated the political will of the Allied coalition and the leadership's determination to defeat a common enemy, Iraq. As the international race for ballistic missile technology continues in the 21st century, the reasons for proliferation remain unchanged. Leaders in three distinct regions see missiles as symbols of power and as deterrents to threats posed by regional powers. Nine countries currently pose a ballistic missile threat to the United States and its allies.

Iraq, Iran, Syria and Libya all possess missiles capable of threatening Israel and the United States' interests in the Middle East. Three of the four have totalitarian regimes with little individual freedom for their people or media to challenge the government. The fourth (Iran) is just moving out of total theocratic control, with a weak democratic government unable to challenge the reactionary *status quo*, which has dictated much of its recent history. In Hitler's Reich, "the Germans had to carry on [with the war] because they were impotent to organize public opposition to Nazidom, and on top of this Goebbel's propaganda had now instilled in them the hope of victory from Hitler's secret weapons."¹ This same scenario would prevail in these countries, as the state-run media would propagandize the effects of terror missiles. Its stature within the region is not based on its economy, government or politics, but on the strength of its military and its ability to threaten its neighbors. It possesses ballistic missiles not only as deterrence against its neighbors, but also as a threat to Israel and to the United States' interests in the Middle East. The introduction of Weapons of Mass Destruction increases the missiles' terror value, but also limits its utility due to deterrence and international pressure. Israel currently deters these countries from using chemical warheads through its threat of immediate nuclear retaliation. This same deterrence is effective in the missile confrontation between India and Pakistan.

Pakistan and India presently do not pose a threat to United States' security, but their political instability could lead to government changes, which could pose a threat in the future. They have engaged in a ballistic missile proliferation race to demonstrate power to each other in

¹ Richard Lamb, *Churchill as War Leader*, pp. 307-308.

their dispute over the province of Kashmir. Both countries are nuclear-capable, and have used nuclear tests as a show of power against each other. The threat of nuclear Mutual Assured Destruction has thus far prevented either country from launching missiles against the other. Both countries have a more open society with government accountability to the people and are less likely to terrorize with their ballistic missiles.

China's threatened use of ballistic missiles against Taiwan has raised tensions in the Far East. China continues to build up an overwhelming missile force facing the island despite President Bush's recent declaration to defend Taiwan. It is unlikely that China would resort to WMD to resolve this conflict because of the overwhelming destruction it would cause. China's threat of ballistic missile attack is most likely for political and diplomatic coercion to win concessions in a negotiated settlement over the disputed island. The United States Deputy Defense Secretary Wolfowitz recently stated, "These missiles are clearly designed to project a threatening posture and to try to intimidate the people and the democratically elected government of Taiwan."² China uses the missile deployment near Taiwan in much the same way that North Korea uses its missiles.

North Korea conducted its missile tests to achieve many geopolitical objectives. It demonstrated technological advancement through the power projection that missiles provide. It threatened South Korea and Japan with provocative missile tests, which also showed its missile capabilities to prospective buyers. It used successful missile launches as political leverage to gain concessions from the United States and Japan on grain sales, oil imports, and other domestic needs. Finally, the government benefited from the propaganda value of the missiles,

providing inspiration to its economically weak population. This totalitarian government used foreign investments in its missile development program to sustain its weak communist economy. This technology transfer is of significant concern to the security of the United States. These transferred missiles include Iran's Shihab-3, Pakistan's Gauri, and India's Agni-2."³ North Korea is currently the world's leading exporter of missile technology, which poses a significant threat to all nations of the world. The impact of the spread of ballistic missiles and their technology is best exemplified by the story of the SCUD missile.

All ballistic missiles developed throughout the world are the result of the spread of German V-2 technology. When the Allied powers overran Germany in World War II, each of the four main powers captured German V-2 scientists, missiles and production facilities, and transported them back to their respective countries for exploitation. The Soviet Union developed four versions of the SS-1c missile (nicknamed SCUD), including the prolific SCUD-B introduced in 1961. The Soviet Union then sold SCUD's to twenty-nine different countries, sometimes going through intermediaries such as Egypt, Libya, Iran and especially North Korea. These SCUD transfers then became the basis for China's, India's and Pakistan's domestic missile programs. The SCUD provided the technological foundation for most of the world's ballistic missiles and continues to spread through its advanced derivatives.⁴ British authorities intercepted a shipment of SCUD missile parts bound for Libya with chemical and biological warheads in November 1999.⁵ Although missiles with a 300-mile range may not seem to

² Bill Gertz, "White House Backs Strong Defense of Taiwan," Washington Times, 4/11/2002.

³ WorldTribune.com, "Tenet: Missile Proliferation changing strategic equation in Middle East, Asia," 2/9/2001.

⁴ Jack Spencer, *The Ballistic Missile Threat Handbook*, pp. 10-11.

⁵ WorldTribune.com, "Brits find SCUD's with Chemical, Biological Warheads tagged for Libya," 1/10/2000.

threaten the continental United States, the Rumsfeld Commission report raised the prospect that ballistic missiles could be launched from submarines, from a surface vessel such as a merchant ship, or launched from a nearby territory or island. With these scenarios, an adversary could easily launch a symbolic missile at the United States that could include a Weapon of Mass Destruction.⁶ To combat the ballistic missile terror threat, the United States and its allies have taken many steps to reduce the use and effectiveness of these weapons of terror.

Stopping terror has involved a vast array of offensive and defensive countermeasures by the United States and other targets of missile terror. The most direct offensive countermeasure is to find and destroy the launchers, missiles and storage facilities before missiles are fired. The Allied air forces in World War II bombed the fixed launch sites, but never interdicted the mobile V-2 missiles, and only stopped the V-2's when ground forces overran the launch areas. In the Iran-Iraq War, neither nation possessed the capability to destroy the launchers, either before or after missile launch. During the Gulf War, the Allied coalition combined a sophisticated array of satellites, aircraft, and Special Operations soldiers to destroy the launchers before and after firing.

Defensively, recipients of missile attacks have developed civil defense protection for their populations. London already employed the best civil defense organization in Europe after years of Luftwaffe bombing, although their shelters were only partially adequate against the V-2's. Iran attempted to build bomb shelters in 1988 in its War of the Cities, with only limited success due to lack of time and resources.⁷ In the Gulf War, Israeli and Saudi cities had bomb

⁶ Donald H. Rumsfeld, *Executive Summary, Report of the Commission to Assess the Ballistic Missile Threat to the United States*, pp. 2-3.

⁷ W. Seth Carus, *Ballistic Missiles in the Third World*, p. 48.

shelters and chemical protective masks, but generally they were not used, due to the inaccuracy of the SCUD's and the advent of the Patriot anti-ballistic missile. While there was no defense against the V-2, by the Gulf War the anti-ballistic missile diminished the terror threat posed by Hussein's SCUD's. Interestingly, Hussein proclaimed in 1990 that he had developed the AL-Faw 1 anti-ballistic missile to intercept Iranian SCUD's. Hussein proclaimed that, "Iraqi anti-missile missiles have now guaranteed the neutralization of missiles and remove their effectiveness in any forthcoming confrontation between the Arabs and their enemies."⁸ There is no evidence that Iraq deployed or utilized this missile in the Gulf War. The overwhelming success of the Patriot encouraged the development of more advanced anti-missile missile defenses to protect cities and military targets in the future. The joint Israeli-United States Arrow missile, and the United States' PAC-3 ballistic missile interceptor are two examples of this new defensive technology. Deterrence through the threat of retaliation continues to be an effective countermeasure, although it leads to increasingly aggressive arms races and the potential escalation to WMD. In addition to countermeasures, countries have also taken diplomatic steps to limit the spread of missile technology.

The Missile Technology Control Regime was an agreement reached in April 1987 between the United States and its allied countries to limit ballistic missile proliferation. Canada, France, Germany, Great Britain, Italy and Japan agreed to limit the risk of nuclear proliferation by controlling the transfer of complete missile systems, components and technology of missiles with a range of 300 kilometers or more.⁹ The United States applied diplomatic pressure to

⁸ Carus, *Ballistic Missiles in the Third World*, pp. 50-51.

⁹ *Ibid.*, p. 56.

Argentina to ultimately cancel its Condor II program in 1993. China pledged in 1997 to halt nuclear cooperation with Iran. North Korea in 1994 agreed to halt construction of its nuclear reactors in exchange for guarantees of American, Japanese and South Korean fuel oil imports, and other assistance with domestic energy needs. These diplomatic efforts at preventing missile proliferation may reduce threats in the future, but the lack of verification of their compliance may reduce the usefulness of these agreements.

Desperate leaders facing seemingly certain military defeat have resorted to using ballistic missiles as weapons of terror. High explosive missiles have only limited military utility and are only useful as political weapons. Their effectiveness depends on the targeted civilians' morale, the political strength and leadership of the government, and the country's ability to defend itself. To be effective, missiles must be used against a politically divisible target. Terroristic leaders have learned to exploit the media to help achieve this goal by using them to publicize the terror campaigns in an effort to demoralize the enemy's populace. The Communist Afghan government fired over 1000 SCUD's against rebels, with as many as six launched against a single target at one time.¹⁰ Of no military value, these launches were also politically irrelevant since there was no political entity to target. There must be a targeted political leadership who will ultimately decide the success or failure of terror missiles. Winston Churchill, rattled by the V-2s more than by any other event of World War II, contemplated using poison gas against Germany.¹¹ Lamb also states "It is a shock to find that Churchill contemplated initiating mustard gas and anthrax attacks against Germany, and shows to what straits a national leader may be

¹⁰ Carus, *Ballistic Missiles in the Third World*, pp. 10-11.

¹¹ Lamb, *Churchill as War Leader*, p. 347.

driven when his plans go wrong.”¹² The proliferation of ballistic missiles ensures that desperate leaders will resort to terror to achieve their political objectives. The introduction of WMD increases their destructive capability, but reduces the likelihood of their use, due to deterrence. Ultimately, anti-ballistic missile technology may make terror missiles irrelevant and obsolete, by removing the terror threat against civilians.

¹² Ibid., p. 312.

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VITA

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