

Lessons Learned

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Antiaircraft Artillery Lessons Learned 1938-1945

Abstract

This essay is going to examine the relationship between the Antiaircraft Artillery and the rest of the Army Corps. This essay will look at how American units developed from the interwar period to the end of the Second World War (WWII). Specifically this work will examine the Antiaircraft Artillery from the period of 1938-1945. This essay will take you chronologically through the problems that the Antiaircraft Artillery faced during the war. It will then relate lessons learned by the American Antiaircraft Artillery during WWII to the current doctrine of the Air Defence Regiments within the Royal Regiment of Canadian Artillery today.

A trade with no purpose, that is how the United States Army, and many other armies, looked upon their Antiaircraft Artillery in the 1930 and early 1940s. Some of the most important antiaircraft lessons came out of the Second World War. And during this war the Antiaircraft Artillery finally came into its' own. During the interwar period, ie the period between World War I and II, the Antiaircraft Artillery showed limited development. They were not acquiring any new equipment or training techniques. With the onset of WWII this stagnancy changed. America began building new Antiaircraft Artillery pieces. Much of what they built was sent to England, as Poland and France had already been annexed by Germany, and the remainder went to American units. After the attack at Pearl Harbour on 7 December 1941, the US declared war. Their first stop was North Africa. The Antiaircraft Artillery learned many lessons in the African campaign.

And they were necessary for the start of the European campaign and Normandy. The remainder of the war was met with a series of technological improvements, which turned the war in favour of the Allies. How does this all relate to the Royal Regiment of Canadian Artillery? Many of the lessons learned have been applied to the doctrine that is used today. But firstly, the US Antiaircraft Artillery from the interwar period to the end of the African campaign.

Interwar Period to North Africa

The US Antiaircraft Artillery (AAA) came out of the interwar period in rough shape. They had few guns besides those used by the Coast Artillery in defence of the mainland, and most of those were outdated, like the 40mm Bofors and single .50 cal. Machine gun. The onset of war in Europe and the East led to American acquisition of the 90mm and quad .50 from Britain. The Army was expanding faster than training and equipment could manage; therefore, they struggled to organize, train, and equip an expanding antiaircraft artillery force.¹ The AAA hit the ground running and all units were assigned to the field army.² The AAA was attached to, but did not fall under the direct chain of command (COC) of the field army. The result was a series of issues regarding who was actually in charge of the AAA. Battalions of AAA were allocated to the corps groups, usually one 90mm gun (the high-altitude air defence of World War II) battalion and two automatic weapons (AW) battalions (the short-range air defence of

¹ Bryon E. Greenwald. Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 274.

² E. Paul Serrmens, Col. "D-Day," ADA Yearbook 1994: Accessed 18 Oct 09.
<http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

World War II) to each group.³ The automatic weapons battalions used both mounted and dismounted .50 cal and other machine guns in the antiair role. This concept of a layered air defence is also doctrine for the Royal Regiment of Canadian Artillery today.

American forces met little resistance when they landed in North Africa. As they moved inland, however, enemy air activity increased. AAA units shot down a number of enemy aircraft. Unfortunately, in their eagerness to engage the enemy, antiaircraft crews also shot at friendly planes.⁴ Fratricide early on in the war caused the AAA to rethink much of its previous doctrine. The Army quickly realized it needed more “teamwork” between its antiaircraft and air forces.⁵ In Africa blue on blue incidents between AAA and friendly aircraft were particularly frequent. For all of its success in defending against air attack, the antiaircraft force in North Africa experienced significant problems as well. Fratricide was particularly bad with soldiers occasionally so excited that they often fired on anything that flew.⁶ Slowly the AAA field troops in concert with the pilots established an unwritten code in order to help diminish the number of blue on blue incidents. Many units invented localized solutions to guard against fratricide, including having friendly aircraft rock their wings (Lame duck procedure) upon returning to Allied lines, painting aircraft noses different colors, and dropping smoke.⁷ All of this aided the

³ E. Paul Semmens, Col. “D-Day,” *ADA Yearbook 1994*: Accessed 18 Oct 09.
<http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

⁴ Bryon E. Greenwald. *Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945*. Ohio: Ohio State University, 2003. Page 310-311.

⁵ Bryon E. Greenwald. *Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945*. Ohio: Ohio State University, 2003. Page 336.

⁶ Bryon E. Greenwald. *Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945*. Ohio: Ohio State University, 2003. Page 319.

⁷ Bryon E. Greenwald. *Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945*. Ohio: Ohio State University, 2003. Page 321.

AAA troops to better distinguish between friend and foe. The AAA higher command also instituted better aircraft recognition training state-side as well as distributing flash cards for soldiers to study overseas. The only anti-fratricide standard institutionalized by the Army was the one imposed by General Paul Robinette. In its October 1943 *Lessons from the Tunisian Campaign*, the War Department maintained that “positive identification of aircraft is essential before fire is opened. The best identification under such circumstances is attack by the aircraft.”⁸ As is most often the case, the rule allowed the AAA to fire in self defence. Both of these actions taken by the AAA command are currently instituted in the doctrine of the Royal Regiment of Canadian Artillery. The Canadians teach many classes on aircraft recognition to the soldiers in order to avoid blue on blue and speed up reaction times. However these precautions are not foolproof for on several occasions, *Luftwaffe* pilots approached Allied airfields with their landing gear down, usually at dusk, with their landing lights blinking. This made it nearly impossible for the AAA crews to differentiate between friend and foe. This tactic, derisively labelled a “sucker play” by antiaircraft crews.⁹ Reports indicate that the Germans even used captured Allied aircraft to attack friendly forces.¹⁰

The third major doctrinal change that came about during the African campaign was the shift from static to manoeuvre warfare. The war of manoeuvre required

⁸ Bryon E. Greenwald. Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 321.

⁹ Bryon E. Greenwald. Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 341.

¹⁰ Bryon E. Greenwald. Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 342.

antiaircraft forces to operate in new and different ways.¹¹ The two biggest changes that occurred as a result of the African campaign and manoeuvre warfare were in regards to AAA reconnaissance (recce) and platform mobility. American AAA commander Gen. "Big Ed" Timberlake linked up with a British air defence brigade that had fought in the North African campaigns. He had a long conversation with them about how they did their reconnaissance, selection and occupation of positions (RSOP). The British believed in a simultaneous reconnaissance and movement. The RSOP party would move out immediately after a mission brief with the main body. The main body would follow behind, not waiting for the RSOP body to return. The RSOP party left a series of colour coded cans by which the main body was guided into the objective.¹² As a result, the antiaircraft artillerymen became very proficient at RSOP, but more importantly, movement and mobility became a mentality for air defenders of the First U.S. Army.¹³ This can be seen in the Royal Regiment of Canadian Artillery's recce by force; which is not always used, but is frequently an option. The Canadian Field Artillery currently applies this doctrine in Afghanistan. The recce crew merely heads the column instead of traveling on its own and giving possible positions away to the insurgents. Platform mobility was also a major issue in regards to the AAA in the African campaign. North Africa and the battles that followed were part of a war of manoeuvre that demanded mobile and agile antiaircraft weapons. To their credit, the Antiaircraft Command and the

¹¹ Bryon E. Greenwald. Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 327.

¹² E. Paul Sermens, Col. "D-Day," ADA Yearbook 1994: Accessed 18 Oct 09.
<http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

¹³ E. Paul Sermens, Col. "D-Day," ADA Yearbook 1994: Accessed 18 Oct 09.
<http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

Ordnance Department quickly enacted modifications to correct both of these problems.¹⁴ The American AAA quickly realized the importance of the AW battalions. They were highly manoeuvrable and provided excellent coverage at close range. In order to increase their manoeuvrability many AW systems were self-propelled. Gone was the importance of the 90mm towed system which proved to be too slow during the African campaign. The fast and light AW battalions proved to be more effective in modern combat. The AAA used these skills throughout the African campaign. The next step was Italy and then Normandy. The brigade dictated that all the air defenders who participated in the invasion of Normandy conduct amphibious training with the units they would support on D-Day.¹⁵

D-Day

First Army planners expected the invasion force to advance inland as much as 200 miles on the first day of the invasion. The air defence concept, therefore, was to send Army air defence units ashore with the initial landings to defend the beachheads.¹⁶ But as per most aims this one was not fully achieved. The initial American forces hit the beach at 0630 on June 6, 1944.¹⁷ The AAA had spent months in England training with the combined arms team, and were finally accepted as a valuable asset. AAA soldiers were

¹⁴ Bryon E. Greenwald, Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 318.

¹⁵ E. Paul Sernmens, Col. "D-Day," ADA Yearbook 1994: Accessed 18 Oct 09. <http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

¹⁶ E. Paul Sernmens, Col. "D-Day," ADA Yearbook 1994: Accessed 18 Oct 09. <http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

¹⁷ E. Paul Sernmens, Col. "D-Day," ADA Yearbook 1994: Accessed 18 Oct 09. <http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

among the first waves of soldiers landing on the beach. The invasion of Normandy would become the largest American AAA operation in history.¹⁸ The AAA were expected to use their guns in the ground support role, but due to the steepness of the bluffs and the slope of the beach, the AAA was only able to shoot at the highest points on the bluff. The low bluff at the edge of the beach made it next to impossible for most of the antiaircraft guns to fire in a ground support role.¹⁹ Throughout the first day of battle the landings were continuous. New Allied troops were arriving in waves on the beaches. The landings continued, and by 1830, the antiaircraft artillerymen began concentrating on the exits from the beach.²⁰ However, the AAA did successfully manage the *Luftwaffe* threat along the beachhead. The Germans did attack Utah Beach. At 1030 on June 7, four Folke-Wulf 190s strafed the beach. The 474th shot down one aircraft. Around noontime, five more FW-190s attacked from the east, and the antiaircraft artillerymen destroyed four. At 1400, the Germans attempted a third attack, this time with four ME-109 fighters. All the German fighters were destroyed by the 474th.²¹ D-Day was not just a great victory for the American Army; it was also an accomplishment for its antiaircraft artillery.²² And by D+3, there were 53,000 AAA soldiers in France.²³ The battles on the

¹⁸ E. Paul Sermens, Col. "D-Day," *ADA Yearbook 1994*; Accessed 18 Oct 09.
<http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

¹⁹ E. Paul Sermens, Col. "D-Day," *ADA Yearbook 1994*; Accessed 18 Oct 09.
<http://www.airdefenseartillery.com/online/ADA%20In%20Action/WWII/WWII/D-Day.pdf>.

²⁰ E. Paul Sermens, Col. "D-Day," *ADA Yearbook 1994*; Accessed 18 Oct 09.
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²¹ E. Paul Sermens, Col. "D-Day," *ADA Yearbook 1994*; Accessed 18 Oct 09.
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²² E. Paul Sermens, Col. "D-Day," *ADA Yearbook 1994*; Accessed 18 Oct 09.
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²³ E. Paul Sermens, Col. "D-Day," *ADA Yearbook 1994*; Accessed 18 Oct 09.
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American beaches played out fairly similarly to those faced by other countries that day. If anything could be gleaned from this day it would be the importance of a mixed unit, or a combined arms team. This can be seen today in the Royal Regiment of Canadian Artillery's training. The Royal Regiment of Canadian Artillery trains to act as a cog in the wheel, not as the wheel itself. Both the air defence, field and horse artillery are invaluable assets to the combat team. Success for the combat team as a whole is dependant on a mix of resources. This is very apparent by looking at the AAA itself, where success only occurred via a mix of low, mid and high level air defence. This lesson was not only learned through the regiments own experiences; but also through the examples of others, like the American AAA on D-Day.

Technology and Remagen Bridge

After D-Day, a battle-hardened AAA corps and a series of technological improvements helped to claim victory in the war for the Allies. While antiaircraft artillerymen struggled to coordinate their efforts and avoid shooting friendly aircraft, they increasingly benefited from better weapons and equipment.²⁴ Better radar and the proximity VT fuse both played a major role in shaping the final days of the war. The new radar systems were incomparable to those that came before, especially when compared to the sound ranging equipment favoured during the interwar period. When the German's began launching V-2 rockets, the Allies even devised a plan to counter them by using data from the SCR-584 to pinpoint launch sites.²⁵ The AAA was an integral

²⁴ Bryon E. Greenwald. Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 354.

²⁵ Bryon E. Greenwald. Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 359.

resource on the battlefield in the final days of the war for Europe. Besides the SCR-584 radar, the other significant technical development that affected antiaircraft operations was the invention of the proximity fuse.²⁶ The Proximity fuse debuted during the Battle of the Bulge in December 1944. It was used by the 90mm. During the battle, the VT artillery round enabled artillerymen to fire airbursts over attacking German infantrymen without an observer in any type of weather, day or night. The use of the VT artillery round is credited with breaking up several attacks and causing General George Patton to remark: "The funny fuse won the Battle of the Bulge for us."²⁷ In the Battle of the Bulge, the 482d AW Battalion had performed so well the combat commands requested their AAA fire units be positioned to fire primarily in the ground role.²⁸ However his did not come to pass and the AAA continued to provide systems for its main function, defence of the skies. The last major battle of note for the American AAA is the Battle for Remagen Bridge. At the Battle for Remagen Bridge, from 7 to 21 March, an estimated 442 German aircraft, including sixty-seven new Me-262 jet fighters, attacked the bridge and the surrounding defences.²⁹ On top of sending jets the Germans also launched many V-2 missiles at the bridge, all to no avail. The air defence web surrounding the bridge was too impressive. There were hundreds of antiaircraft guns and machine guns, which

²⁶ Bryon E. Greenwald, Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 359.

²⁷ Bryon E. Greenwald, Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 362.

²⁸ E. Paul Serrmens, Col. The Hammer of Hell. Chapter 5:Para 156. Accessed 18 Oct 09.
<http://www.airdefenseartillery.com/online/ADA%20In%20Action/AntiaircraftArtilleryman/Hammer/Default.htm>.

²⁹ Bryon E. Greenwald, Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945. Ohio: Ohio State University, 2003. Page 383.

ultimately ensured the bridge's safety.³⁰ The battle for Remagen Bridge ranks as one of the greatest Antiaircraft Artillery battles in American history.³¹ The battle cemented the Antiaircraft Artillery's place, and finally gained them the respect, of the rest of the Army.³²

Conclusion

The Royal Regiment of Canadian Artillery has learned many lessons over the years. Some are from their own experiences; whereas others are learned from the experiences of others. The American Antiaircraft Artillery went through many of the same experiences as the Canadians. The antiaircraft artillery establishment gained final legitimacy in the eyes of the War Department and its combat commanders by earning respect where it counted most—on the battlefield.³³ The AAAs success was entirely dependant on the external support given to it from the Army. Technological improvements like the VT fuse and new radar systems helped the AAA at Remagen Bridge. The AAAs skill at the ground support role saved lives on D-Day. And all of this was a result of the lessons learned in North Africa. American AAA doctrine changed continuously throughout the war. Many of the lessons learned by the American AAA in WWII are now the basics for the Royal Regiment of Canadian Artillery. The clearest

³⁰ E. Paul Sermens, Col. *The Hammer of Hell*. Chapter 5:Para 152. Accessed 18 Oct 09. <http://www.airdefenscartillery.com/online/ADA%20In%20Action/AntiaircraftArtilleryman/Hammer/Default.htm>.

³¹ E. Paul Sermens, Col. *The Hammer of Hell*. Chapter 5:Para 153. Accessed 18 Oct 09. <http://www.airdefenscartillery.com/online/ADA%20In%20Action/AntiaircraftArtilleryman/Hammer/Default.htm>.

³² Bryon E. Greenwald. *Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945*. Ohio: Ohio State University, 2003. Page 384.

³³ Bryon E. Greenwald. *Understanding Change: An Intellectual and Practical Study of Military Innovation U.S. Army Antiaircraft Artillery and the Battle for Legitimacy, 1917-1945*. Ohio: Ohio State University, 2003. Page 403.

examples of the lessons learned that currently apply to military doctrine are the theory of recce by force, the use of mixed range anti-aircraft systems and the reliance upon new technology. Modern radar and the proximity fuse helped to win the battle of the bulge for the Americans, and this is often seen as the turning point in the European campaign. We still see this idea being applied to the modern Royal Regiment of Canadian Artillery's anti-aircraft systems and doctrine. The Air Defence Anti-Tank System (ADATS) has its own radar and can set its missile fuses to proximity instead the regular High Explosive (HE). Therefore, the lessons learned by the American AAA in the Second World War have been applied to modern Canadian doctrine. However, the most lasting result of the AAAs role during WWII is its acceptance as a valuable member of the mixed combat group. The AAA had finally proven itself as a trade with a purpose.

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