

***The Fires of Normandy:
The Command and Control of Tactical Fire Support in the
Second World War
By
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When we went into battle at Falaise and Caen we found that when we bumped into battle-experienced German troops we were no match for them. We would not have been successful had it not been for our air and artillery support.

-- General Charles Foulkes

Although analysis of targeting is normally focussed at the operational and strategic level, the development of the Allied *tactical* fire support during the Second World War was a key step in the evolution of joint targeting. At the outbreak of the war, western offensive doctrine focused on manoeuvre and breakthrough, however the German Army's facility for tactical defensive operations rivalled its aptitude for offensive operations. It was only through the concentration of massive tactical fire support that the Allies were able to conduct offensive operations.¹ How were they able to coordinate and concentrate effective tactical fire support? Through an analysis of the Close Air Support (CAS) and artillery support processes, coupled with a case study of Operation TOTALIZE, this paper will demonstrate that the Allies developed an effective command and control (C2) methodology for the employment of tactical fire support.

¹ Paul Johnston, "D+20000: Still Fighting the Normandy Campaign" in *The Army Doctrine and Training Bulletin* (Vol. 3, no. 1, Spring 2000), 49. Johnston conducts a brief but illuminating review of literature concerning the lack of Allied offensive capability in Normandy. Most authors agree that German tactical prowess stymied Allied offensive operations, although a revisionist movement has emerged in the last decade that tries to narrow the perceived gap between German and Allied tactical acumen. Despite this new wave of operational history, the vast majority of authors agree that German skill at defensive operations necessitated the overwhelming use of firepower by the Allies in order to restore manoeuvre.

Close Air Support

Upon the outbreak of war, the question of how best to employ airpower was problematic. Once the Allies had developed a vast fleet of aircraft, attention was turned to determining how best to employ that fleet – strategically or tactically. The campaign in North Africa demonstrated to Allied planners the need to develop an effective CAS system, however neither the land nor the air component could agree as to the best way to provide tactical air support. The Army envisaged direct C2 over organic air support, whilst the Royal Air Force (RAF) preferred to retain C2 of its resources and focus on strategic bombing. The debate went as high as Prime Minister Churchill whose compromise dictated that a certain amount of airframes were to be dedicated solely to CAS, but the RAF would retain full C2 of those assets.²

Having established that at least some RAF assets would be dedicated to CAS, an effective C2 system had to be put in place. To determine best practices, the British established the joint Army/Air Force Wann/Woodall Committee with the goal to determine how best to integrate CAS into land manoeuvre.³ The result was the creation of a system of radio links, which allowed for the timely relaying of CAS requests from forward “tentacles” to higher headquarters.⁴ These tentacles, and the air support coordination centres that were established at division- and brigade headquarters, became the nervous system-like network that coordinated CAS strikes to facilitate land operations. These tentacles would

² Paul Johnston, “Tactical Air Power Controversies in Normandy: A Question of Doctrine” in *Canadian Military History*, (Vol. 9, no. 2, Spring 2000), 61.

³ *Ibid*, 61.

⁴ *Ibid*, 61.

become the forerunners of the teams that are now known as Forward Air Control (FAC) parties or Joint Tactical Air Control (JTAC) parties.

In terms of practices, three types of CAS missions emerged – indirect support against targets not immediately engaged with friendly forces; direct support against enemy in contact with friendly elements; and armed reconnaissance missions that ranged over the battlefield and engage targets of opportunity.⁵ To supplement the standard tentacles, Forward Control Posts were established at the priority headquarters with communications with pilots to direct them towards targets. Additionally, Visual Control Posts – tentacles augmented with a fighter-bomber pilot who could communicate with aircraft - were pushed forward and were capable of directing air strikes onto targets.⁶ To facilitate the engagement of targets, the “cab rank” system of loitering fighter-bombers near the forward edge of the battlefield was used. Although costly in airframes and flexibility, the cab rank system established the ability to rapidly vector CAS onto targets when land formations were in contact.⁷

The expected Allied breakthrough in Normandy did not materialize. Consequently even greater firepower was required to smash through the German defences.⁸ If the initial debate on airframe allocation in support of ground manoeuvre was contentious, the evolving debate about using strategic bombers in a CAS role was even more so.⁹ Amidst considerable rancour, Allied heavy

⁵ *Ibid*, 62-63.

⁶ *Ibid*, 62-63.

⁷ Paul Johnston, “The Question of British Influence on U.S. Tactical Air Power in World War II” in *Air Power History*, (Spring 2005), 22.

⁸ J.B.A. Bailey, *Field Artillery and Firepower* (Annapolis: Naval Institute Press, 2004), 308.

⁹ W.A. Jacobs, “The Battle for France” in *Case Studies in the Development of Close Air Support*, (Washington, DC: Office of Air Force History, 1990), 267.

bombers were employed as CAS several times during the summer of 1944.¹⁰

The inclusion of heavy bombers added another layer onto the already overwhelming supply of fire support available to Allied planners, although the efficacy of the bombers was problematic. By the summer of 1944 the Allies had an effective CAS system in place.

The CAS system was not without its faults. By maintaining tactical airframes within the C2 of the RAF, a certain amount of redundancy was created between Army and Air Force staffs. CAS would have been more effective had it been employed by a single staff with a single command authority.¹¹ Likewise, while the vast majority of Army CAS requests were filled, those CAS requests were often overly tactical with very little consideration of operational impact.¹² These drawbacks notwithstanding, CAS was a crucial enabler to ground manoeuvre and key addition to the Allies' organic artillery support.

Artillery Support

During the inter-war years, the Artillery fell on hard times. At the outbreak of the war, the Artillery had been relegated to a minor role in Allied doctrine. Like air power, however, when faced with the intransigent German defences, Artillery returned to a role of prominence.

The horrors of immobile trench warfare were still fresh in the minds of Allied leaders in the early years of the war. The technological advances of the tank and tactical airpower, coupled with the unpleasant memories of the First World War, conspired to ensure that the focus of Allied doctrine in 1939 was on

¹⁰ *Ibid*, 239.

¹¹ *Ibid*, 242.

¹² Johnston, "Tactical Air Power Controversies...", 69.

achieving breakthrough and penetration with manoeuvre.¹³ Unfortunately, when the war began, the Allied leaders discovered to their consternation that they were no match for the withering offensive action of *blitzkrieg*. During operations in both France and North Africa, British forces were caught on the back foot and set about finding a way in to stop the implacable German war machine. Eventually the British determined that the solution to the repeated reversals they suffered lay in returning the artillery to its position as the predominant arm on the battlefield. It was not until the British built up significant artillery that they were finally able to stanch German offensives with massive artillery fires, and then commence offensive operations. Major-General (Retired) J.B.A. Bailey observed that during the North African Campaign “the British reverted to the tactics of the First World War based on static defence and the infantry assault, supported by massive artillery firepower. This combination, not the tank, was responsible for almost every major British success until the end of the war.”¹⁴

The change in doctrine forced a change in organization and attitude. In late 1942 and early 1943 a massive re-centralization of artillery occurred. For example, General Bernard Montgomery directed that “the divisional CRA [Commander Royal Artillery – commander of all artillery in a division] have centralized command of their divisional artillery, which was to be used as a seventy-two-gun battery.”¹⁵ Further, in September 1942 the British Army created the first Army Group Royal Artillery (AGRA)¹⁶ in which medium and field

¹³ John Mosier, *The Blitzkrieg Myth*, (New York: Harper Collins, 2003), 10.

¹⁴ Bailey, *Field Artillery and Firepower ...*, 297.

¹⁵ *Ibid*, 306.

¹⁶ *Ibid*, 72.

regiments were brigaded. Although nominally an Army-level asset, in practice AGRAs were allocated to a Corps, to reinforce its organic artillery. The ability to concentrate overwhelming fires that resulted from the creation of the AGRAs was one of the major factors that led to final victory.¹⁷

This prodigious amount of fire power required an effective C2 system to properly employ. The artillery C2 system permitted the rapid concentration of fires at the decisive point. A key element of this system was the reorganization of the Royal Artillery (RA) in December 1940. Under this reorganization, which was the result of the Bartholomew Committee's investigation into operations in France during 1940, the RA divided each regiment into three batteries of two, four-gun troops. Each troop was commanded by a subaltern who acted as a Forward Observation Officer (FOO), thus providing two FOOs and a Battery Commander to support each manoeuvre battalion. The addition of a second-in-command to the artillery regiment allowed the artillery Commanding Officer to attach himself permanently to the manoeuvre brigade commander.¹⁸ This organization employed an intricate radio network that linked FOOs to artillery command posts (CP), each in turn linked to flanking and higher CPs. FOOs supporting the main effort were designated CRA's representatives and authorized to fire the full weight of the divisional, and reinforcing, artillery.¹⁹ Thus, in a matter of minutes a

¹⁷ G.W.L. Nicholson. *The Gunners of Canada Volume II*. (Toronto: McClelland and Stewart, 1972), 111.

¹⁸ Shelford Bidwell & Dominic Graham. *Fire-Power, The British Army Weapons and Theories of War 1904-1945*. (Barnsly: Pen and Sword Military Classics, 2004), 253.

¹⁹ John A. English. *The Canadian Army and the Normandy Campaign. A Study of Failure in High Command*. (New York: Praeger, 1991), 162-163.

FOOs call for fire could be answered by dozens of artillery batteries at Division, Corps and Army level.

It was this system that made the artillery so effective. The system allowed the Allied armies to concentrate fires to suppress objectives during attack, and then cut the inevitable counterattack to pieces with defensive fire.²⁰ This was the only effective solution to the problem of implacable German defences.²¹ Historian Lee Windsor observed:

Anglo-Canadian doctrine ...used predictable artillery barrages to force Germans underground while Allied infantry rushed forward to arrive amid enemy positions the moment the shelling lifted. Instead of advancing deeper after killing or capturing the defenders, the next Allied step called for assaulting troops to dig in... When the inevitable enemy counter-attack materialized, German soldiers faced the tactical disadvantage of exposing themselves and their vehicles as they advanced into prepared killing zones. While not glamorous, this method proved highly effective.²²

Although effective, artillery was not a panacea. Rolling, box and creeping barrages expended tonnes of ammunition, the majority of which never landed anywhere near the enemy.²³ The majority of fire missions were fired unobserved, on predicted coordinates, often with little to no effect.²⁴ Despite these drawbacks, when the rounds did find their targets, artillery was the critical enabler that allowed Allied manoeuvre units to achieve tactical success.

²⁰ Roman Johann Jarymowycz. "Der Gegenangriff von Verrieres. German Counterattacks during Operation 'Spring': 25-26 July 1944" in *Canadian Military History*, (Vol. 2, no. 1), 76.

²¹ Terry Copp, "Bite and Hold" in *Legion Magazine* (Vol. 84, no. 1), 28-30.

²² Lee Windsor, "Updating the Official Gospel: Canadian Military History's Third Wave" *Acadiensis*, Vol XXXIII, no. 2, spring/summer 2004.

²³ Ian V. Hogg, *Barrage, the Guns in Action*. (New York: Ballantine Books, 1970), 34-51. Hogg gives an excellent, technical account of the means and results of barrages during the Second World War.

²⁴ Bailey, *Field Artillery and Firepower...*,312.

Joint Fires –Bringing it All Together in Operation TOTALIZE

In order to counteract the Allied supremacy in firepower, the Germans relied on defence in depth.²⁵ This necessitated the use of Allied airpower to augment artillery in both weight of fire and range.²⁶ An excellent example of how the Canadian Army achieved this is Operation TOTALIZE – an attack by 2nd Canadian Corps south of Caen during the first half of August, 1944.

It is beyond the scope of this paper to go into great detail concerning the manoeuvre plan for TOTALIZE, but some time must be dedicated to it in order to fully understand the context in which the fire plan was developed. 2nd Canadian Corps was the spearhead of the attack for the First Canadian Army. 2nd Corps maintained its complement of divisions, the 2nd and 3rd Canadian Infantry Divisions as well as the newly arrived 4th Canadian Armoured Division. In addition to this, the Corps was bolstered with both the 51st Highland (UK), and 1st Polish Divisions. The Corps Commander, Major-General Guy Simonds, decided upon a brazen assault broken into three phases. During the first phase, the 2nd Canadian Division with the 2nd Canadian Armoured Brigade under command, and the 51st (H) Division with the 33rd British Armoured Brigade under command, using the Caen-Falaise Road as an inter-divisional boundary, would move forward and secure their objectives which lay between two- to three-kilometres away. Once the first objective line was secure, Phase II would begin during which the 4th Canadian Armoured Division on the right, and the 1st Polish Armoured Division on the left, would conduct a forward passage of lines through the 2nd

²⁵ *Ibid*, 319.

²⁶ Elie Tenenbaum, "The Battle over Fire Support. The CAS Challenge and the Future of Artillery", *Focus Strategique*, no. 35, October, 2012, 14.

Canadian and 51st Highland Divisions, and then thrust southward an optimistic six kilometres. Following behind the 4th Canadian Armoured Division was the 3rd Canadian Infantry Division who was tasked to secure the left and right flanks of the advance, leaving the two armoured divisions to focus on preparing for the next phase. Upon achieving their objectives, Simonds' intent for Phase III was to be prepared to exploit further, hopefully on to Falaise itself.²⁷

The ground over which the Corps would advance was ideal for German defensive tactics, with plenty of hills and wood lines in which anti-tank guns and tanks could hide in firing positions to engage the Canadian forces as they advanced. To rob the Germans of this force multiplier, Simonds decided upon a night time attack that would allow the Canadian forces to advance to the point that the range gap between Canadian and German tanks would be nullified. Additionally, in order to provide them protection and mobility, the infantry were mounted in armoured personnel carriers named *kangaroos*, or, *defrocked priests*. These were the chassis of M7 "Priest" 105 mm self-propelled guns, with the guns removed, which were available after the field artillery regiments of the 3rd Canadian Divisional Artillery exchanged them for the towed 25-pounder howitzers.²⁸

To complement this audacious manoeuvre plan, a robust fire plan was required. The officer with overall responsibility for the fire plan was the

²⁷ 2nd Canadian Corps Operation Instruction Number Four, Operation "Totalize" dated 5 Aug 44.

²⁸ Nicholson, *The Gunners of Canada...*, 310. 3rd Canadian Division, being the assault division on D-day, had its field artillery regiments equipped with self-propelled 105 mm guns to facilitate their easy off-loading from the landing ships, as well as providing the guns greater mobility in the soft sand of the beaches. Both of these were lessons learned by the 1st Canadian Divisional Artillery during Operation HUSKY in Sicily, July 1943.

Commander Corps Royal Artillery (CCRA) of 2nd Canadian Corps – Brigadier Bruce Matthews. With Matthews as the chairman, the whole fire plan was designed by a committee that included the commander of the 2nd British Army's artillery, the CRAs of the divisions participating, and the commanders of the four AGRAs supporting the attack.²⁹

The artillery fire plan had an enormous amount of fire power dedicated to it. The attack was supported by 720 guns that fired over 200, 000 rounds.³⁰ There was to be no preliminary bombardment in order to ensure some degree of surprise was maintained, but an aggressive Counter Battery programme incorporating 312 guns attempted to silence enemy artillery prior to H-hour.³¹ At H-hour, the fire plan called for the guns to fire a rolling barrage that would advance at the rate of 100 yards per minute until it reached the first objective.³² The barrage covered a frontage of four thousand yards and was six thousand yards deep. On the gun line, the 25-pounder howitzers would lift their ranges by two-hundred yards every two minutes, while the 4.5 inch medium guns would fire superimposed four hundred yards in depth.³³

During Phase II, divisional artilleries would revert to divisional control, with the priority of fire from the AGRAs going to the 4th Canadian Armoured and 3rd Canadian Infantry Divisions. During Phase III, if the attack was successful, Matthews decided that the divisional artilleries would remain responsive to their

²⁹ *Ibid*, 312.

³⁰ *Ibid*, 314-315.

³¹ *Ibid*, 312.

³² 2nd Canadian Corps Operation Instruction Number Four, Operation "Totalize" dated 5 Aug 44.

³³ George Blackburn, *The Guns of Normandy: A soldiers Eye View, France, 1944*, (Toronto: McClelland and Steward, 1997), 326.

divisions, but each armoured division would have a medium regiment placed in support. As well, the AGRAs would move forward to gun positions closer to the front line and remain on call once in place.³⁴ Additionally, one hour and forty minutes after H-hour, a twenty-four minute Counter-Battery fire plan would be fired by 312 guns on known hostile battery locations. This fire plan was to be repeated at H+ 7 hours as well.³⁵ A critical part of the fire plan was the “Apple Pie” programme aimed at the suppression of enemy air defence elements. The Apple Pie fire plan was so successful that it became the standard doctrine for any attack that incorporated close air support, and air support was to be a critical component of the TOTALIZE fire plan.³⁶

A key aspect of the TOTALIZE fire plan was the augmentation of the artillery fire support with tactical and strategic aircraft providing close support to the land formations. TOTALIZE was not the first time that the Allied forces had used strategic aircraft to support a ground assault. As mentioned previously there was intense debate amongst the Allied leadership as to the wisdom of employing strategic bombers in support of land manoeuvre, but although British Air Marshall Harris and US General Hap Arnold griped, they nonetheless acquiesced to the diversion of strategic bombers to support tactical land manoeuvre.³⁷ During Operation GOODWOOD on 18 July the Allied assault to seize the open terrain to the south of Caen was preceded by a bombing run consisting of 1600 bombers that dropped a total of 7700 tons of high explosive

³⁴ 2nd Canadian Corps Operation Instruction Number Four, Operation “Totalize” dated 5 Aug 44.

³⁵ Blackburn, *The Guns of Normandy...*, 327.

³⁶ Nicholson, *The Gunners of Canada...*, 313.

³⁷ Terry Copp, *Fields of Fire, The Canadians in Normandy*, (Toronto: University of Toronto Press, 2003), 135.

on the German positions.³⁸ Although the operation itself did not achieve its overall objectives, the bombing was found to be effective.³⁹ Thus, during TOTALIZE, Simonds' plan once again call for further strategic bomber support.

The 2nd Canadian Corps' assault was preceded by a strategic bomber attack of 1020 heavy bombers dropping 3,500 tons of bombs during the first phase, and 429 bombers dropping 1488 tons of bombs during the second phase.⁴⁰ The proximity of the bombing runs to the friendly troops caused some consternation to the air staffs, but that apprehension was overcome when, in an excellent example of joint integration, the artillery demonstrated that they could successfully mark the bomber targets with red and green smoke.⁴¹

Strategic bombers were not the only air support that was available to 2nd Canadian Corps. Throughout the operation, 83 and 84 Tactical Air Group, RAF flew Armed Reconnaissance missions ahead of the assaulting land elements, attacking targets of opportunity beyond the front line. Despite this overwhelming superiority in fires, the 2nd Canadian Corps' attack was not destined for complete success.

In the end, the fire plan was the most complex part of the assault.⁴² The manoeuvre plan, as described above, was actually relatively simple and straightforward. The fire plan, conversely, incorporated organic, reinforcing and flanking artillery fire, supplemented with strategic and tactical air support. It was truly a symphony of fires that only the most adept *maestro* could hope to direct.

³⁸ Nicholson, *The Gunners of Canada...*, 295.

³⁹ Copp, *Fields of Fire...*, 136.

⁴⁰ *Ibid*, 314-315.

⁴¹ Nicholson, *The Gunners of Canada...*, 310.

⁴² Copp, *Fields of Fire...*, 195.

Notwithstanding the competence of the artillery staffs involved, and the effective command and control network that had been laboriously developed over five years of war, there was bound to be a hiccup.

Phase I of the attack went generally well. The fire plan began on time, but things started to go awry almost immediately. Despite accurate target marking by both the artillery and the master bombers, a large number of the bombers missed their targets, dropping their ordnance to the north of the German positions.⁴³ Consequently, despite the prodigious amount of fire support dropped on the German positions, the bombing failed to have any serious impact on the enemy.⁴⁴ Regardless, the lead elements fought through the initial German defences, and in many cases enemy elements that were left unscathed by the initial fire plan were overrun with an infantry and armoured assault, supported by a localized fire plan.⁴⁵ Eventually, after much hard fighting, the lead elements reached their Phase I objective and hunkered down to await the second bombing run that would signal the launch of the Phase II assault.

Although poised for a potentially rewarding exploitation manoeuvre, the tactical pause that was caused by the rigid adherence to the fire plan caused Simonds to lose the initiative. While the Phase II forces marshalled to carry on the advance, awaiting the second bombing run, the German defenders were able

⁴³ *Ibid*, 200.

⁴⁴ *Ibid*, 201.

⁴⁵ *Ibid*, 202.

to reorganize, reinforce and counterattack. Any possibility at a breakthrough to Falaise went begging.⁴⁶ Unfortunately, this was not the worst part of the situation.

While the Phase II elements lined up on the start line, the second wave of bombers was enroute to their bombing run. As they approached, something went terribly wrong. H-hour for the second phase was scheduled for 1400 hours, with the first bombing runs commencing at 1300 hours. Unfortunately during the first run, two groups of 12 US B-17 bombers, sent off course by heavy flak fire, dropped their bombs short and onto the Canadian and Polish rear elements causing 350 casualties.⁴⁷ Despite the excellent command and control system designed to facilitate CAS, there was no way to stop the bombing runs once they began. To compound the problem, as chaos erupted within the 2nd Canadian Corps during the friendly fire, the Germans launched a concerted counter-attack onto the start line of the assault!⁴⁸ Despite this, the German counter attack amounted to little, thanks to well placed anti-tank guns. Since the lead elements of the Phase II assault were not affected by the short bombing, the attack was able to commence on time. Unfortunately, due to the tactical pause between phases, the attack eventually sputtered out and at the end of the day on 8 August the lead elements of the 2nd Canadian Corps settled in. Over the next several days the Canadians continued to advance, albeit slowly. Although TOTALIZE never achieved its ambitious goal, it nevertheless serves as an excellent

⁴⁶ Roman Johann Jarymowycz, "Canadian Armour in Normandy, Operation 'Totalize' and the Quest for Operational Manoeuvre" in *Canadian Military History* (Volume 7, Number 2, Spring 1998), 25.

⁴⁷ Copp, *Fields of Fire...*, 204.

⁴⁸ *Ibid*, 204.

example of how both the artillery and air C2 systems in Normandy facilitated effective joint tactical fire support.⁴⁹

Conclusion

We were no match for Germans once they were dug in. It could be argued that everything being equal, defenders always hold an advantage over attackers. But in Normandy everything wasn't equal. We held the advantage; in the air, at sea and on the ground. Yet every time our troops got beyond the range of supporting artillery or sour weather grounded our fighter-bomber cover, the Germans stopped us cold.

--Major-General Harry Foster

During the Second World War the Allies developed an effective C2 methodology for the employment of tactical fire support. When faced with effective German defensive operations, it was only the concentration of massive, centrally-controlled and rapidly applicable fire support that allowed the Allies to break through the German lines. This overwhelming fire support was facilitated by a responsive air and artillery C2 scheme that was born of the trials and tribulations faced by the Allies in the North African desert, and refined during operations in Normandy. Although not perfect, the C2 construct for the provision of tactical fire support was a critical component of Allied success. The CAS and artillery lessons learned in North Africa and North-West Europe shaped how modern operations are planned and executed, and is a key juncture in the evolution of joint targeting.

⁴⁹ Brian A. Reid, *No Holding Back: Operation Totalize, Normandy, August 1944*, (Toronto: Robin Brass Studio, 2005), 104-133. Reid provides an excellent overview of the tactical and technical aspects in his chapter "Bullets and Bombs – The Fire Plan." Whereas most historians' treatment of fire plans is restricted to a very cursive overview, Reid (a retired Gunner officer himself) goes to great effort to explain the logistical and technical nuances that went in to coordinating the extensive fire plan.

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