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**How did Signals Intelligence Assist the United States in
Fighting Japan in the Pacific War of 1941-45?**

Essay prepared for Doctor Paul Maddrell

The Past and Present of US Intelligence

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University of Salford
22 March 2002

**‘It is fatal to enter any war
without the will to win it.’**

- General Douglas MacArthur (1880-1964)
American commander of the Allied
forces in the Southwest Pacific.

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INTRODUCTION

In the study of World War Two, the Pacific theatre sometimes seems to be a completely distinct war, far from Germany, Britain, and Europe in general. The war in the Pacific was indeed very particular, involving more aircraft carriers attacks than *blitzkrieg* assaults, more bombardment of harbours and ships convoys than night raids on cities, and more invasion of islands than occupation of entire countries. However, what is common to both the Pacific and European theatres of war is the role played by intelligence – more precisely signals intelligence. Signals intelligence (SIGINT) is the intelligence derived from interception and analysis of signals and includes communications intelligence (COMINT), electronic intelligence (ELINT) and telemetry intelligence (TELINT). In the war against Germany as in the war against Japan, SIGINT efforts were directed against high-level communications among the enemy's armed forces and Allied cryptanalysts succeeded in breaking the codes used by both countries¹, greatly contributing to the Allied victory.

This essay is about the use of SIGINT and will discuss how it was used and what impact it had on the development of the Pacific War from after the attack on Pearl Harbor² (7 December 1941) to the surrender of Japan (14 August 1945). Since virtually all the signals intelligence used during the Pacific War was COMINT, it is that latter term that will mainly be used throughout this essay.

My argument is that even without signals intelligence, the United States would have defeated the Japanese in the Pacific War anyway but the use of that type of intelligence saved

¹ These efforts and their cryptanalytic results were given the codename ULTRA. The first German ENIGMA code to be broken in 1940 was the one used by German air force. Japanese diplomatic code PURPLE was broken in 1940 (codename MAGIC), the Japanese navy fleet code system JN25 in April 1942, and the Japanese ground forces code in April 1943.

² A vast amount of literature already exists on the intelligence aspect of the attack on Pearl Harbor but such topic will no be part of this essay since it could not be logically incorporated into an essay on the *American campaign against Japan during the Pacific War*. For a serious, well-documented history see Edwin T. Layton, Roger Pineau and John Costello, *'And I Was There': Pearl Harbor & Midway, Breaking the Secrets*, New York, Morrow, 1985 and for relations between intelligence analysts and policymakers, see Roberta Wohlstetter, *Pearl Harbor: Warning and Decision*, Stanford, Stanford University Press, 1962.

ships, battles and human lives while greatly shortening the war. To support my argument, I will present five different examples where signals intelligence made the difference either between victory and defeat or between minor and major losses. Before and after these examples will be presented broader contextual features of the Pacific War and of the role SIGINT played in its development. The conclusion will then assess whether these examples accurately reflect the global picture of how signals intelligence assisted the United States in fighting Japan in the Pacific War.

1. THE CONTEXT AFTER THE ATTACK ON PEARL HARBOR

When the United States declared war on Japan, the Japanese were somehow already at war with the United States. And the attack on the American base at Pearl Harbor in Hawaii on 7 December 1941 had a decisive impact on how the Americans were to approach the unfolding war in the Pacific. In the months that followed the attack, Japan gained control of the Philippines, the Dutch East Indies (now Indonesia), much of New Guinea, the Solomon Islands, Guam, and other strategic areas all over the western Pacific. Japan even occupied part of the Aleutian Islands, which belonged to Alaska, and threatened to invade Australia as well.

The United States was also at war with Germany since that same day of December 1941 and it is clear that for President Franklin Delano Roosevelt, Germany had to be defeated first. France had fallen in June 1940 and therefore the survival of Britain became a priority for the United States. Such a context explains the lesser degree of attention paid by Washington to the efforts invested in fighting the Japanese.³ However, the disastrous blow suffered at

³ See Christopher Andrew, *For the President's Eyes Only: Secret Intelligence and the American Presidency from Washington to Bush*, London, HarperCollins, 1995, p. 121. Professor Andrew agrees with a study from the National Security Agency saying that 'had their importance been recognized and an adequate number of cryptanalysts set to work on them, JN25b could have been broken in time to reveal preparation for the surprise attack on December 7, 1941. The low priority given to the attack on JN25b was due, in part, to the myopia of the Navy Department that had failed to grasp the importance of SIGINT in naval warfare.'

Pearl Harbor made the Americans realize the importance of acquiring intelligence on enemy's intentions and capabilities, especially in an area like the vast Pacific Ocean where fleet movements of the enemy and of its convoys are of fundamental – if not vital – importance. Breaking the Japanese Fleet code JN25 then became the top priority for cryptanalysts based in one of the two naval radio intelligence centres located in Melbourne, Australia, and in Pearl Harbor, Hawaii (HYPO, later known as FRUPac), in addition to another centre formed in Washington (NEGAT) in February 1942.⁴ Since Allied intelligence services had no effective agents or spy networks in the homeland, nor were there Western sympathizers with access to useful military or diplomatic information, prisoners of war, radio intelligence (for traffic density analysis and mere-direction finding), captured Japanese documents and codebooks, and aerial reconnaissance also provided the Americans with valuable information on Japan's intentions and capabilities. But it is signals intelligence, and more precisely COMINT, that was to play the greatest intelligence role in the Pacific War.

2. SIGINT IN OPERATION

2.1 In the Coral Sea

The first example used to study the role of SIGINT in the war against Japan is the Battle of the Coral Sea of 8 and 9 May 1942. In early 1942 like in 1941, the Japanese felt that their hope for success was laying in rapid conquests combined with the destruction of the

⁴ See Frederick D. Parker, *A Priceless Advantage: U.S. Navy Communications Intelligence and the Battles of Coral Sea, Midway, and the Aleutians*, Fort George G. Meade: National Security Agency Center for Cryptologic History, 1993 [Online transcription], p. 11. The centre on Corregidor (CAST) was no longer affiliated with a fleet command, and its collection and processing capabilities were rapidly disintegrating as a result of evacuations of personnel to Australia and destruction of its facilities by bombing and gunfire.

United States fleet in the Pacific. In the first six months of the war⁵, the Japanese had gained control of several strategic areas – including the Philippines – but the Americans were to achieve a major triumph when succeeding to break the Japanese Fleet code JN25. ‘By April 1942, enough information was known to allow the American Pacific Fleet to deal the first blow without visual sighting of the Japanese Fleet at the Battle of [the] Coral Sea.’⁶ In this battle, the Japanese advance had been checked for the first time. Radio intelligence provided ‘advance information that a group of transports, protected by the Japanese carrier Shoho and by a covering force including two other carriers, was on its way to occupy Port Moresby.’⁷ Thanks to that intelligence, the Americans could concentrate their limited forces to maximize their impact and sink the Shoho. Although they also succeeded in damaging a second carrier, the Americans lost the aircraft carrier Lexington, had the Yorktown heavily damaged and one destroyer and one oilier sunk.

In military terms, the battle ended ‘without clear victory for either side [but] it effectively stopped the Japanese advance towards Australia.’⁸ From a strategic perspective, though, the Americans won an important victory. Important first because the invasion of Port Moresby was thwarted, boosting Allied chances in the bitterly fought New Guinea campaign and quashing a threat to the supply lines running between the United States and Australia. Second, the Japanese were denied the services of their two newest carriers on the eve of the Battle of Midway. Had these two carriers been available on 4 June 1942, things might well have turned out very differently at Midway.

⁵ Admiral Isoroku Yamamoto was aware of the necessity to act as quickly as possible in order to knock the wind out of the Americans: ‘If I am told to fight regardless of the consequences, I shall run wild considerably for the first six months or a year, but I have utterly no confidence for the second and third years.’ *Id.*, p. 1.

⁶ Commission on Roles and Capabilities of the United States Intelligence Community, *Preparing for the 21st Century: An Appraisal of U.S. Intelligence*, Washington, The Commission, 1996, p. A6.

⁷ United States Strategic Bombing Survey, *Summary Report, Pacific War*, Washington, Government Printing Office, 1946 [Online transcription], p. 4.

⁸ Christopher Andrew, *For the President’s Eyes Only*, *supra* note 3, p. 124.

2.2 The Battle of Midway

The year 1942 saw an important reorganization of signals intelligence: an end was put to the peculiar arrangement between military and naval cryptanalysts for producing MAGIC decrypts on alternate days, the Signal Intelligence Service (SIS) was given the sole responsibility for working on diplomatic traffic, and an agreement of 30 June 1942 ‘formally gave responsibility for diplomatic and military SIGINT to the army, for naval SIGINT to the navy, and for clandestine radio communications to the Federal Bureau of Investigation (FBI) and the Coast Guard.’⁹

After the Battle of the Coral Sea, the Americans switched from a defensive mode to a more aggressive one. The Battle of Midway of 4 June 1942 is a remarkable exercise of a small-scale locally planned and implemented deception which contributed to a strategically significant victory.¹⁰ And the deception strategy used at Midway was based on the intelligent use of COMINT.

In June 1942, Japanese Admiral Isoroku Yamamoto drew plans for an invasion of Midway Island in a move to extend Japanese defensive perimeter. However, Yamamoto’s exceptional strategic mind led him to design a needlessly complex operation involving the division of his fleet into three task forces, each powerful in itself but too far apart for mutual support. But it was still ‘the most powerful surface forces yet assembled in the war.’¹¹ Radio intelligence informed the commander in chief of the US Pacific Fleet, Admiral Chester W. Nimitz, of the enemy battle plan. Nimitz could then position his three aircraft carriers Enterprise, Hornet and Yorktown¹² 350 miles northeast of Midway, ‘from where, on the

⁹ *Id.*, p. 123.

¹⁰ See Katherine L. Herbig, ‘American Strategic Deception in the Pacific, 1942-44’, *Intelligence and National Security*, vol. 2, no. 3, July 1987, pp. 260-300.

¹¹ United States Strategic Bombing Survey, *Summary Report, Pacific War*, *supra* note 7, p. 4.

¹² Thanks to breathtakingly effective repair efforts, the Yorktown was back into action after the beating she suffered during the Battle of the Coral Sea.

morning of June 4, he was able to launch a surprise attack on the larger Japanese fleet. Midway, Nimitz said later, ‘was essentially a victory of intelligence. In attempting surprise, the Japanese were themselves surprised.’ With the loss of four of the six aircraft carriers that had carried out the attack on Pearl Harbor, Yamamoto was forced back on the defensive.’¹³

The Battle of Midway has become a classic example of the successful operation of the communications intelligence process. The American victory was entirely due to a truly incredible performance of the entire naval COMINT organization. And for the Japanese Navy, this marked the end of any real strategic offensive capability. From now on, the war would be fought against the backdrop of an inexorable increase in US naval might.

2.3. Convoy 81 in the Battle of the Bismarck Sea

The Battle of the Bismarck Sea is another classic example of the effective application of SIGINT. Signals intelligence had identified the presence at Rabaul of ‘a large troop convoy [...] which was due to sail for the northern coast of New Guinea, under heavy escort, to reinforce the Japanese presence there.’¹⁴ From 2 to 4 March 1943, in 400 sorties and with the loss of only two bombers and three fighters, the Americans succeeded in almost completely annihilating the Japanese Imperial Navy’s Convoy 81: the whole convoy of eight ships and four of the destroyers were sunk. The Japanese had lost twelve ships and 4,000 men in one of the greatest victories of American air power at sea. ‘The Japanese never again attempted to move anything larger than a small barge by daylight within range of Allied aircraft.’¹⁵

¹³ Christopher Andrew, *For the President’s Eyes Only*, *supra* note 3, p. 124.

¹⁴ Ronald Lewin, *The Other Ultra*, London, Hutchinson, 1982, p. 185. The author identifies the reinforcement troop as the Japanese 15th Infantry Division while Edward J. Drea identifies it as the 51st Division (see Edward J. Drea, *MacArthur’s ULTRA: Codebreaking and the War against Japan, 1942-1945*, Lawrence, University Press of Kansas, 1992, p. 61).

¹⁵ John Winton, *ULTRA in the Pacific: How Breaking Japanese Codes and Cyphers Affected Naval Operations Against Japan, 1941-45*, London, Leo Cooper, 1993, p. 106.

Although not related to the Battle of the Bismarck Sea, another event, just a month later, provided more evidence of the amazing role that SIGINT played in helping the Americans to read Japanese's plans. Nimitz was presented with a decrypted Japanese signal dated 14 April 1943 revealing that four days later 'Yamamoto, in a plane escorted by six fighters, would be paying a rapid visit to locations in the Rabaul area.'¹⁶ Nimitz passed the information to Admiral William Frederick Hasley, commander of the South Pacific forces, who got the agreement of the Secretary of the Navy and of President Roosevelt himself to plan the assassination of the Imperial Navy's Admiral. On 18 April 1943, 'eighteen Army Air Force P-38 fighters took off from Henderson Field on Guadalcanal, flew low over the ocean to evade Japanese radar, intercepted Yamamoto's plane, and shot it down over the southern tip of Bougainville Island.'¹⁷ Although that operation represented a great risk to have the Japanese conclude that their signals were being intercepted and decrypted by the Americans, the episode proved to have worth the risk since it marked, 'if not the beginning of the end, at least the end of the beginning.'¹⁸

2.4. Air assault on airdromes at Wewak

The Japanese suffered another crucial blow in August 1943. While the Battle of the Bismarck Sea cut off the naval supply line to eastern New Guinea, the assault on Wewak completely annihilated Japan's air superiority over New Guinea. There again, ULTRA provided the opportunity. At that time, the Japanese were building up air bases on the northern New Guinea coast. The development of these bases could be kept under scrutiny

¹⁶ Ronald Lewin, *The Other Ultra*, *supra* note 14, p. 187. A copy of the decrypt is presented on pp. 188-189.

¹⁷ Christopher Andrew, *For the President's Eyes Only*, *supra* note 3, p. 137. The author rightly notes that as the same time, the BRUSA agreement on SIGINT collaboration between British and Americans was being negotiated.

¹⁸ Ronald Lewin, *The Other Ultra*, *supra* note 14, p. 191.

thanks to signals intelligence. ULTRA also allowed the Americans to identify vulnerable airdromes they could target in order to maximize their impact and minimize their losses.¹⁹

The use of ULTRA in the planning of these deadly raids remains a very good example of signals intelligence saving lives as well as planes and ships.

2.5. The Hollandia operation

The formidable Hollandia operation that Edward J. Drea called ‘ULTRA’s great victory’ took place between January and April 1944. Indeed, one could hardly think of a better example to illustrate how greatly signals intelligence assisted the United States in fighting Japan in the Pacific War. In brief, the operation began when the Japanese acquired forward bases in the Admiralties and more specifically when ULTRA revealed the reinforcement of the Hansa Bay area where the Japanese anticipating Allied landings. Indeed, General Douglas MacArthur, commander of the Allied forces in the Southwest Pacific, had plans to invade that bay in 1943 but the intelligence provided to him led to the cancellation of the proposed Hansa Bay landings in favour of a direct ‘jump’ to Hollandia. The information in MacArthur’s hands was of extremely high quality, giving him knowledge of Japanese dispositions and defensive strategies according to which he literally tailored his operation to take greatest advantage of Japanese weaknesses.

The strategy adopted was tremendously risky but by cleverly using available COMINT, MacArthur could carefully plan a successful three-part operation involving a feint attack where the enemy expected his heaviest assault, and a powerful move on Hollandia with

¹⁹ See Edward J. Drea, *MacArthur’s ULTRA*, *supra* note 14, p. 61. Apart from that mention by Drea, this remarkable episode is surprisingly not reported elsewhere in the main literature on signals intelligence in the Pacific War. That fact, in addition to the significance of such an episode, makes this American victory worth mentioning in this essay.

a secondary landing at Aitape.²⁰ In doing so, MacArthur cut the Japanese convoy routes, destroyed Japanese air power and enveloped Japanese ground forces. 'It would be the largest SWPA [Southwest Pacific Area] operation to date, ultimately involving 217 ships moving 80,000 men with supplies 1,000 miles in order to bypass and isolate Japanese Eighteenth Army.'²¹ Once isolated by air and by sea, Hollandia was ready to be invaded by American ground forces. There again, signals intelligence had provided the Americans with an extraordinary opportunity to strike where the Japanese were weak at a time when they were unprepared. The Hollandia operation remains therefore a classic example of the contribution of signals intelligence to the operational level of warfare.

3. THE GLOBAL PICTURE OF SIGINT IN THE PACIFIC

Although it is relevant to look at specific and narrow examples of how signals intelligence was used in the Pacific War, one should not forget to look at the more global picture in which SIGINT played its role, thus the present section.

For example, apart from the strict military perspective, political interests were at stake. In fact, from the Battle of Midway in June 1942, the Allies focused increasingly on each other's future ambitions, rather than the common enemy. Rivalry existed between British Prime Minister Sir Winston S. Churchill and President Roosevelt over the future of empire in Asia. On the SIGINT level, however, the United States and Britain were collaborating efficiently. The geographic location of the two allies played a role in the distribution of work:

²⁰ See Ronald Lewin, *The Other Ultra*, *supra* note 14, p. 250.

²¹ Edward J. Drea, 'Ultra Intelligence and General Douglas MacArthur's Leap to Hollandia, January-April 1944', *Intelligence and National Security*, vol. 5, no. 2, April 1990, p. 330.

Britain concentrated on cryptanalysis against Germans and Italians while the United States concentrated on the Japanese.²²

Another fact that should be kept in mind when studying the global picture of SIGINT in the Pacific War is that the Japanese language represented a challenge in itself for American cryptanalysts. The United States could count on the efforts of native Japanese speakers to translate the decrypts into English but the challenge was far greater than the one faced by British cryptanalysts working on German or Italian messages in Europe. The Japanese were aware of that 'additional challenge' faced by the Americans and were also confident that their enciphering technology was unbreakable. 'Cloaked behind the double veils of sophisticated ciphers and complex language, the Japanese army believed its radio communications codes were unbreakable. Japanese communications officers were convinced that they had learned much from their earlier rude initiation into the perils of using insecure codes.'²³

Signals intelligence was not always cleverly and on some occasions, the poor use of available intelligence led to disasters. For example, in 1945, 'the landings at Leyte Gulf, which incurred heavy casualties, reflected poor use of both signals intelligence and ground intelligence provided by the guerrillas. [...] But these calamities also underlined the fact that MacArthur himself was capable of ignoring sigint completely when it threatened to contradict his own strategic purposes.'²⁴ In fact, MacArthur's practice was to not allow intelligence to interfere with his aims. This was true on some occasions but globally, MacArthur as well as Nimitz – the 'Neptune of the Pacific' – and the other leaders of the American forces involved in the Pacific War regarded intelligence as the decisive asset which was to make a difference in the outcome of the war.

²² Sir Harry Hinsley, 'The Influence of ULTRA in the Second World War', *University of Cambridge Computer Laboratory*, [Online], <http://www.cl.cam.ac.uk/Research/Security/Historical/hinsley.html> (Page visited on 10 March 2002).

²³ Edward J. Drea, *MacArthur's ULTRA*, *supra* note 14, p. 8. See also Edward J. Drea and Joseph E. Richard, 'New Evidence on Breaking the Japanese Army Codes', *Intelligence and National Security*, vol. 14, no. 1, January 1999, pp. 62-83.

²⁴ Richard James Aldrich, *Intelligence and the War against Japan: Britain, America and the Politics of Secret Service*, Cambridge, Cambridge University Press, 2000, p. 241.

An additional interesting issue on which debate still persists today among scholars and historians is the role played by signals intelligence in the American decision to use the atomic bomb on 6 and 9 August 1945. At that time, Harry S. Truman was in office and he was receiving information about Japanese reinforcement efforts. Army Chief of Staff General George C. Marshall estimated that an invasion of Japan homeland would cost at a minimum one quarter of a million casualties and might cost as much as a million.²⁵ MacEachin presents an interesting argument when saying that ‘the fact that these numbers were dramatically higher than those which Marshall had presented at the 18 June meeting with the President was probably the result of knowledge that the Japanese were positioning a much larger defense than had been forecast. This notion carries a further implication that Marshall’s statement was influential in the decision to use the atomic weapon. If true, this would establish a link between the intelligence reporting and the decision to drop the bomb.’²⁶ The decision was finally taken to use the atomic bomb first on Hiroshima then on Nagasaki. And ‘had Germany still been in the war²⁷, it rather than Japan would probably have been the first target for the atomic bomb. And, given that Marshall and others had told [Truman] about Ultra’s dramatic role in hastening Germany’s defeat, he may also have concluded that SIGINT had saved Europe from becoming the birthplace of nuclear warfare.’²⁸

CONCLUSION

The United States emerged from the Cold War as the only clear remaining superpower but even during the Second World War, its military capabilities were hardly rivalled by those

²⁵ Whether in fact Marshall actually made such a statement remains a matter of some ambiguity.

²⁶ Douglas J. MacEachin, ‘The Final Months of the War with Japan: Signals Intelligence, U.S. Invasion Planning, and the A-Bomb Decision’, *Center for the Study of Intelligence*, [Online], <http://www.cia.gov/csi/monograph/4253605299/csi9810001.html> (Page visited on 9 March 2002).

²⁷ Germany officially surrendered in May 1945.

²⁸ Christopher Andrew, *For the President’s Eyes Only*, *supra* note 3, p. 153.

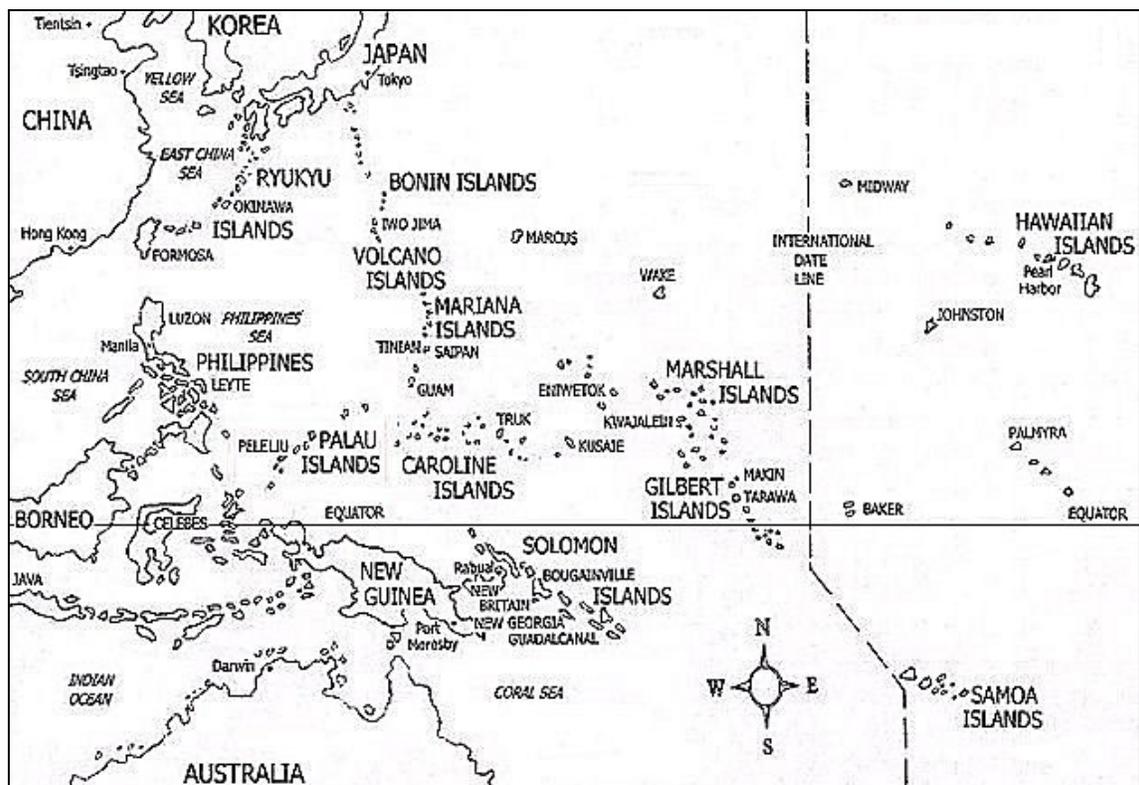
of other nations. Even Yamamoto admitted that the only way to achieve a successful war against the Americans was to strike before they could develop and deploy their full potential. Mainly thanks to invaluable intelligence, the Americans did deploy their arsenal in the second phase of the Pacific War to aggressively fight back. Therefore, one way or the other, the Americans – with the help of the other Allies involved – would have defeated the Japanese. The difference lies in the casualties and the damages suffered as well as, more importantly, in the position of both sides when the war came to an end. Signals intelligence greatly shortened the war and allowed the Americans to be in a much stronger position in August 1945 than they would have been had the war been continuing. The overall assessment of how SIGINT assisted the United States in fighting Japan leads us to the conclusion that ‘[b]y intercepting, deciphering, and translating the Japanese Navy’ s messages that contained ~~the~~ order of battle, the timetables for their military operations [...], and a myriad of vital details concerning their most secrete plans and intentions, the communications analysts were vindicated of any taint of failure from Pearl Harbor.’²⁹ Marshall provides a relevant conclusion to this topic by summarizing the importance of SIGINT at the operational level of the war he was fighting against the Japanese: ‘Operations in the Pacific are largely guided by the information we obtain of Japanese deployments. We know their strength in various garrisons, the rations and other stores continuing [sic] available to them, and what is of vast importance, we check their fleet movements and the movements of their convoys. The heavy losses reported from time to time which they sustain by reason of our submarine action largely results from the fact that we know the sailing dates and routes of their convoys and can notify our submarines to lay in wait at the proper point.’³⁰

²⁹ Frederick D. Parker, *A Priceless Advantage*, *supra* note 4, p. 1.

³⁰ Christopher Andrew, *For the President’s Eyes Only*, *supra* note 3, p. 142, referring to a letter from George C. Marshall to Thomas E. Dewey (governor of New York) dated 25 September 1944. The episode about Dewey being convinced by Marshall not to publicly disclose information about the use of ULTRA by the Americans is reported in Lewin pp. 5-15.

APPENDICES

Appendix 1. The Southwest Pacific Ocean



Source: Sean Prizeman, 'Maps', *The Battle for Peleliu*, [Online], <http://www.peleliu.net/Maps/Pacwarmap.htm> (Page visited on 13 March 2002).

Appendix 2. Chronology of the war in the Southwest Pacific theatre

1941

- 7 December Japanese attack Pearl Harbor, Hawaii
- 8 December Japanese invade Malaya
- 10 December Japanese invade Philippines

1942

- 15 February Singapore surrendered to Japanese
- 9 April American surrender of Bataan
- 18 April General Headquarters of Southwest Pacific Area (GHQ, SWPA) established
- 6 May Japanese capture Hollandia, Dutch New Guinea
- 7-8 May Battle of Coral Sea
- 3-6 June Battle of Midway
- 23 July to
 - 23 January Papuan Campaign
 - 7 August to
 - 21 February Guadalcanal Campaign

1943

- 16 February Sixth Army established in SWPA
- 11 May US 7th Infantry Division invades Attu
- 30 June New Georgia landings (US 43rd, 37th, and 25th Infantry divisions engaged)
- 21 August US and Canadian forces occupy Kiska
- 4 September 9th Australian Division lands at Lae area
- 16 September Lae captured
- 22 September Australians land at Finschhafen
- 2 October Finschhafen captured
- 1 November Bougainville landing
- 20 November Gilbert Islands (Tarawa) landings
- 15 December Arawe, New Britain landings by 112th Cavalry Regiment

1944

- 2 January Saidor, New Guinea landings by 126th Regimental Combat Team
- 1 February US invades Marshall Islands
- 29 February Invasion of Admiralty Islands (1st Cavalry Division)
- 30 March Hollandia bombed and Japanese air power destroyed
- 22 April Hollandia and Aitape landings

Source: Edward J. Drea, 'Ultra Intelligence and General Douglas MacArthur's Leap to Hollandia, January-April 1944', *Intelligence and National Security*, vol. 5, no. 2, April 1990, p. 344.

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Ronald Lewin, *The Other Ultra*, London, Hutchinson, 1982.³²

Douglas J. MacEachin, 'The Final Months of the War with Japan: Signals Intelligence, U.S. Invasion Planning, and the A-Bomb Decision', *Center for the Study of Intelligence*, [Online], <http://www.cia.gov/csi/monograph/4253605299/csi9810001.html> (Page visited on 9 March 2002).

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John Winton, *ULTRA in the Pacific: How Breaking Japanese Codes and Cyphers Affected Naval Operations Against Japan, 1941-45*, London, Leo Cooper, 1993.

³¹ Transcription of a speech given in front of the Cambridge University Computer Laboratory's Security Group on 19 October 1993.

³² Published in the United States the same year by Farrar Straus Giroux, New York, as *The American Magic: Codes, Ciphers and the Defeat of Japan*.