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Intelligence

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Until recently, much was hidden about the role of intelligence in the Second World War. Today, the evidence is strong, despite the destruction or withholding of records on Soviet, and particularly Japanese, intelligence. However, that evidence has not been assessed thoroughly by specialists, nor incorporated into broader accounts of the war. The story also is told uncritically, from the perspective of Allied sword against Axis shield, at the peak of the success of ULTRA. Actually, the intelligence war was a real competition, involving Axis successes and Allied failures. Axis intelligence services ranged from incompetent to good, mostly mediocre. Allied ones were poor to great, mostly good. Initially, however, the states superior in intelligence and material misused these advantages. American, British and Soviet forces often were too poor to exploit the advantages provided by intelligence, while failures of assessment exposed them to devastation from surprise attack. Before 1942, intelligence worked marginally in the Axis's favour, by multiplying the value of their large and good forces. From 1942, the balance of intelligence and power turned simultaneously and systematically toward the Allies. Intelligence did little to cause Axis defeat, but much to shape how the Allies achieved victory.

Intelligence and war

Intelligence is the collection, collation and analysis of evidence to enable an effective and efficient use of scarce resources. Intelligence is not a form of power, but rather a means to guide its use. Intelligence does not win wars. It does help generals do so. It involves finding true and useful secrets while avoiding false notions, and forcing the opposite on the foe, through security and deception. Intelligence is collected through open and secret sources, each with power and limits. Open sources offer the most information, but are

stymied by security procedures. Agents produce vast amounts of unreliable intelligence, and the rarest gems – key documents and inside commentary on their meaning; imagery provides accurate material, often in such quantities that a mass of trivialities masks what matters. From the fount of signals intelligence flows the richest streams of data, but usually these yield first-rate material on second-rate issues, while those on the greatest of matters are hard to tap. Sources matter not because they are secret or complex, but by providing accurate, relevant and timely information for action. A primitive source may equal a sophisticated one in value, an open source a secret one. Developments in open sources often revolutionize the information available for action, as occurred with radar in 1940. Sources rarely tell the whole truth and nothing else. Normally they offer masses of fragments, of uncertain accuracy or marginal relevance. They tell the truth partially and indirectly, by illustrating issues such as quartermasters' accounts or the views of second-rate figures, which illuminate greater matters.

The best intelligence is useless without efficient links between the organs which collect, evaluate and act upon it. Flaws are possible anywhere along the chain. When one link breaks, so will the whole. Accurate intelligence may not be collected or assessed properly. It may not reach a commander in time; he might be unable to use knowledge or mishandle the attempt. A good army with bad information can beat a bad army with good intelligence. At the Battles of Jutland and Midway, intelligence let two navies ambush an ambusher, but one alone won its battle. Fluke and friction so shaped both engagements that they could have gone either way, as in 1941 with the engagements that destroyed *Hood* and *Bismarck*. Knowledge affects war on land, air or sea in different ways, and also when mobile armies operate quickly over large spaces, rather than conducting long and slow campaigns of attrition. Where force-to-space ratios are low, flanks open, firepower far-reaching and precise, breakthrough easy and manoeuvre possible, espionage can contribute to epic victories – letting an attacker concentrate its strength against an enemy's weakness, or a defender focus its forces precisely where the foe plans to attack. In circumstances of high force-to-space ratios, of stickiness, equilibrium and attrition, intelligence provides a series of small advantages, which may wear down the enemy just slightly faster than otherwise might have happened. A mediocre intelligence service can affect a war of manoeuvre more than a good agency does a struggle of attrition. Two first-rate intelligence services may neutralize each other, while a mediocre espionage agency might guide its master to triumph over an incompetent.

Intelligence is one kind of input into many types of competition, ruled by power and comparative advantage, where small discrepancies in many fields between competitors have great consequences. The questions are, what actions does intelligence enable in any competition, and how can competitors use those chances? As intelligence affects every competition within any war in different ways, its overall effect can be measured only by adding its aggregate value in each case for one side, compared to that of the other. The normal result in each case, or all of them, is balance between both sides, or superiority without significance, but often intelligence is a winning factor. It might be a tiebreaker, the weight which determines the outcome of a match where all other factors are balanced. It can shape a competition asymmetrically, as by giving all defenders forewarning of assault against all attackers. It may multiply the effect of one force by 200 per cent, or divide another by 33 per cent. Intelligence might let you concentrate your strength against an enemy's weakness, or shelter your vulnerabilities from its power. In rare cases, usually through the working of an extraordinary source, intelligence strikes like lightning; you learn precisely what you need to know in order to act exactly as you want, as all the holes in the machine of war line up, suddenly and briefly. Such opportunities can be used only by throwing a thunderbolt, with force immediate and focused.

Intelligence before the war

The modern age of intelligence began in 1914, through developments in sources, organization and communication. Intelligence aided military forces, especially in operations, to unprecedented degrees. Collection and assessment agencies exploded in size. During 1913, for example, perhaps a hundred people in the world worked full-time in code-breaking or radio interception; by 1918, these numbers approached 10,000. Bureaucracy and technology enabled a transformation simultaneously in intelligence, power and war. The parts of intelligence changed, but more the whole, and its interaction with knowledge and strategy. Imagery and signals intelligence, joined to the General Staff system, telegraph and radio, produced powerful means to collect, assess and use intelligence. A tight cycle of command, control, communications and intelligence (C3I) emerged for *operations*, as it had done for *strategy* by the 1860s, when it had enabled the deployment of Union forces against Confederates, Prussians against Austrians and French, and British power across the globe.

No single source dominated intelligence in the 1914–18 war. Honours fell equally between observations by one's own troops, interrogation of prisoners

and deserters, agents and communications intelligence; and traffic analysis (material acquired by monitoring the external features of signals systems, without reading the content of messages). By 1918, intelligence services used virtually every technique deployed between 1939 and 1945, including operational deception, controlled agents, and data-processing systems able to synthesize material from thousands of sources in real time and to guide immediate actions by forces or fire, as Britain did with blockade intelligence and defence against early German strategic bombers. Intelligence shaped every operation of all belligerents. The aggregate quality of intelligence in the First World War matched that in the Second World War, but in strategic terms, each side's successes cancelled each other out, while at the operational plane, intelligence was harder to use for dramatic results. Forces were too slow and clumsy to maximize the opportunities that intelligence enabled. The army best served by communications intelligence, that of Austria-Hungary, was too mediocre in overall quality to use it well. The greatest competition of the war, the Western Front, epitomized attrition. Nonetheless, in a war where power was measured by the ability to produce hundreds of thousands of soldiers and millions of tons of steel, intelligence mattered. It multiplied force more than in any previous conflict, as much as in any later one.[1]

Between 1939 and 1941, another great war spread across the world. Intelligence shaped that event, in general and particular ways. On the borders between war and peace, states receive confusing signals, which rivals manipulate. Net assessments – the integration of all sources of information about any competitor – involve many issues, where errors in your judgment of yourself matter as much as those you make about rivals, or they about you. You err by understanding a rival better than it does itself, if that difference in opinions drives actions you do not expect. Between 1936 and 1940, for example, British statesmen misunderstood Italian policy, because they estimated its power and interests better than Benito Mussolini did. He made mistakes, and so did they. During 1933–41, these problems were unusually great. Confusion and mistakes shaped the start of the war, while surprise attacks sucked neutral powers into it. The great powers possessed decent to excellent intelligence services, which often aided policy directly, as by showing Joseph Stalin during autumn 1941 that Japan would not attack the USSR. More generally, however, reason and information were bad guides for statesmen who interpreted power, interest, competition and competitors,

1 The best introduction is Jim Beach, *Haig's Intelligence* (Cambridge University Press, 2013).

and evidence on those matters very differently, in a reciprocal, multilateral and atomized system. Ideas and actions had paradoxical relations. Intentions were not affected, nor effects intended. Ideology, racism and ethnocentrism caused misinterpretations of capabilities and intentions in every capital. The belief that race and spirit made power, led German, Italian and Japanese statesmen to overrate themselves and underrate their foes. The latter misconstrued Axis actions because they interpreted intentions and capabilities through a materialist lens, whether liberal or Marxist-Leninist. They overrated German strength, because of its track record of quality in combat, and fables about its efficiency. Anglo-American statesmen understood Japanese power well, but underestimated the immediate capacity of its air power, and misconstrued its policy because of ethnocentrism: they assumed that Japanese leaders were cautious and rational, and must see their weakness compared to the United States. Neither assumption was correct.[2]

The effect of such errors is best measured by adding all of their elements. The extreme case, the greatest intelligence failure in history, produced an error of 10 million men, twice the size of the German army. During 1940–41, Soviet leaders thought Germany had twice the number of soldiers it really did, while Germans underrated Soviet strength in divisions by half.[3] This story had complex causes. Soviets overrated German strength because they misconstrued its incompetence in recruiting manpower, compared to their ruthlessness. Germans underrated Soviets for the opposite reason. They underestimated the quality of Soviet forces due to racism, but also due to overgeneralization from Russian failures in every war since 1904, while no other state ever has survived the damage inflicted on the USSR in 1941, let alone between 1941 and 1945.

Such problems distorted strategy less once war was under way, and reality trumped imagination. Ideology still shaped state aims, but leaders more accurately assessed comparative power and advantage, and correlated strategy and operations, and intelligence with actions. The Anglo-American alliance took a lead in these matters, with the USSR far behind, followed by Italy and Germany, with Japan lagging. The most powerful of states formulated and executed strategy in the most rational of fashions, and used intelligence best. Weaker ones did so less well, increasing the rate of their rout.

2 For analysis of these issues, and a discussion of the literature, see John Ferris, *Strategy and Intelligence: Selected Essays* (London: Routledge, 2005), pp. 99–137.

3 Roger Reese, *Stalin's Reluctant Soldiers: A Social History of the Red Army, 1925–1941* (Lawrence: University Press of Kansas, 1996), p 163; Geoffrey P. Megargee, *Inside Hitler's High Command* (Lawrence: University Press of Kansas, 2000), pp. 102–16.

Intelligence at war

Between 1939 and 1945, as during 1914–18, economic and demographic power shaped victory no less than did skill in operations. Until 1942, the two coalitions were comparable in economic terms, but the Axis Powers were superior in the conduct of operations, except against Britain in the air and at sea in European waters. From 1942, however, the Allies rapidly became stronger than their foes, and better in most military spheres. In this match, intelligence routinely served as force-multiplier and often as tiebreaker. It shaped the Second World War more than the First, because intelligence supported firepower which could kill and move, enabling more decisive actions, the effect was one-sided for a long time, and one side devoted far greater resources to the task. That outcome took years to emerge. It was manifested in many spheres. Decisions about strategy, at theatre level, or to allocate resources between them or to the construction of specific forces, were driven by ideology, perceptions, military rationality and information from open sources, not secret intelligence. Still, British intelligence did well in reconstructing Nazi economic power, and discerning its vulnerabilities, and even better in assessing technological developments in German weapons before they were deployed, in time to act.[4] Spies provided technological intelligence which boosted Soviet power after 1945.[5] The greatest impact of intelligence, however, lay in operations.

Every source mattered in this war, including prisoners, deserters, agents, captured documents and one's troops, but the leading sources combined technology and organization. During the Great War, limits to aircraft and cameras made imagery a source of tactical intelligence, focused on the trenches; so too aerial reconnaissance, though it provided some operational material. In the Second World War, aerial reconnaissance and imagery became major sources for operational and strategic intelligence, as one aircraft could provide reports on – or 10,000 images from – a location 1,000 miles away, in real time. A new source, radar, routinely acquired targets for

4 F. H. Hinsley et al. (eds.), *British Intelligence in the Second World War: Its Influence on Strategy and Operations* (4 vols., London: HMSO, 1984), vol. III, pt. 1, pp. 53–68, 329–458; R. V. Jones, *Most Secret War: British Scientific Intelligence, 1939–1945* (London: Hamish Hamilton, 1978). The evidence cited in Hinsley et al. is accurate, but their analysis is hampered because they accepted views about the German war economy which since have been exploded; cf. Adam Tooze, *The Wages of Destruction: The Making and the Breaking of the Nazi Economy* (London: Allen Lane, 2006).

5 Stephen T. Usdin, *Engineering Communism: How Two Americans Spied for Stalin and Founded the Soviet Silicon Valley* (New Haven, Conn.: Yale University Press, 2005).

strike warfare. Allied with traffic analysis, it transformed tactical combat at air and sea, and thus air power and sea power. During 1942–43, for example, centimetric radar and direction-finding overcame the greatest Allied naval weaknesses, by breaking the Axis superiority in night fighting which had underpinned the operations of the Japanese navy and German U-boat attacks on convoys.

Pre-eminent among these sources were the many forms of signals intelligence, especially ULTRA, the code word for high-grade Anglo-American communications intelligence against Germany, Italy and Japan. More than any other conflict in history, the Second World War was a communications intelligence war. By 1918, many states possessed signals intelligence bodies, which combined traffic analysis with cryptanalysis against systems with low, medium and high-grade security. After 1919, these bodies diverged. Some attacked only diplomatic telegrams on cable, others low-grade military traffic via radio, while developments in wireless and machine cryptography revolutionized the field. In 1939, the states which first reintegrated the components of signals intelligence and applied them to war had an edge; so, too, those which best did so, especially by mastering the revolutionary application of machines to cryptology.

The quality of intelligence services changed as they switched from competitions of power politics to those of war. The services of one state with decent capabilities, Japan, and of two leaders, Italy and the USSR, slipped because their strengths, like stealing codebooks from embassies, worked better in peace than war. The capabilities of three other powers surged, because they had better technology and emphasized the acquisition of intelligence through technical means, rather than spies. Germany took a quick lead with imagery and air reconnaissance, though Britain and then the United States rapidly passed it; no other country was in the race. Regarding radar, Britain held the lead, pulling the United States to its level, which the latter soon exceeded, the Germans hot on their heels. The story for signals intelligence and security was more complex. The signals security of the Imperial Japanese Navy (IJN) was poor, that of the army good. Both were weak in signals intelligence. The Soviets were poor on defence and attack, while the Italians were decent. In 1939, American military forces developed radio communications well, but were mediocre in signals intelligence and security, though the United States Navy (USN) made innovative use of data-processing machines against IJN cryptosystems. Britain initially suffered from technical misjudgements about signals and security because it underestimated the need for radio communications. Its code-breakers, while excellent,

focused on cable and codebook. British signals security was mediocre, partly because of initial failures in the mechanization of cryptology, but it improved rapidly in both fields. During 1939, Germany led the powers in signals and security. Its military treated radio as a normal means to communicate, used flexibly and securely through the Enigma cipher machine, a good system which Germans handled badly. They focused on gathering signals intelligence from enemy radio nets, which meant they concentrated on easy cryptosystems and paid less attention to hard ones. These characteristics caused failure after 1941, but until then, Germany won the wireless war.

The turning point

In 1939–41, Axis intelligence stood at its peak – a high one, compared to previous history. Before the outbreak of the Pacific War, intelligence served Japan better than it did Britain or the United States, providing all the information needed to launch a surprise attack, while denying defenders the evidence necessary to avoid one. Through consuls, communications intelligence and spies, Japan grasped Anglo-American plans, expectations and deployed capabilities, while its enemies misconstrued Japanese aims and means. Japan maintained an edge in intelligence over China until 1945. German air and army intelligence supported Blitzkrieg well, by providing easily acquirable intelligence for immediate use in airstrike or ground and naval attack. Assisted by procedures of security and deception which masked intentions, they outweighed the performance of Britain and France in 1940, in all areas ranging from collection to assessment; they did so, too, against the Soviets during 1941–42. They matched British intelligence in the desert war. Erwin Rommel's great days as a general coincided precisely with those of his intelligence. When it declined, so did he, and other German generals. Axis commanders relied as heavily on intelligence as Allied ones – they just realized the fact, and nurtured the source, much less. In mobile operations, the interception of radio messages in plain language or low-grade systems multiplied German tactical skill against the British until 1942, the Americans in 1943, and the Soviets during 1944. Signals intelligence affected no aspect of the war more than it did German operations against Soviets. German air and naval agencies matched their Allied competitors until 1943. Above all, in 1941, good – if unsophisticated – deception, intelligence and security helped Germany to start a war with a surprise attack against the USSR, and Japan to do so against Britain and the United States. However, even more than usual in such cases, the main problem was intelligence failure by defenders,

rather than success by attackers.[6] Each of these Axis strikes matched the effect of Allied ULTRA in Europe, or the Pacific. They enabled the Germans to destroy, at low cost, 50 per cent of the soldiers and 90 per cent of the tanks and aircraft which the USSR fielded in 1941; and the Japanese, 20 per cent of the warship tonnage of Britain and the United States. These strikes gave Germany and Japan valuable resources, a year of the strategic initiative and a boost to their slim chances for victory. As events proved, however, the Axis had greater intelligence failures in 1941 than did their enemies.

In 1939–41, intelligence was a low secondary strength for the Axis. From 1942, it became a high secondary strength for the Western Allies, and during 1943, a low but rising one for the USSR, as intelligence guided the big battalions. Measurement of the effect entails adding Allied rise to Axis decline. In particular, during 1939, Britain was mediocre in military signals intelligence and machine cryptology, but it knew what to do when it saw Poles bearing gifts – experience of the correct way to attack Enigma. Then the quality of its institutions enabled Britain to overcome error. Enigma and other high-grade German cryptosystems like *Geheimschreiber* combined communications and security well, though less so than their British and American counterparts, Typex and Sigaba, which remained unbroken.[7] Good machine systems sent messages with unprecedented ease, volume and security, and forced a new era of cryptanalysis, which moved from the craftsman's bench to the industrial age. Codebooks were attacked through analysis by language and logic, and machines by quantity handling. Mathematical analysis, chiselling the fractures of cryptosystems, reduced the number of ways to convert any letter into another, to a level which the brute force of data-processing machines could defeat. Britain led the world in the movement toward machine cryptanalysis, through its unique centralized system for the collection and analysis of intelligence, high coordination between soldiers and civilians, skill in data processing, and recognition of the value of knowledge in war.

By 1941, Britain organized its signals intelligence and imagery with unprecedented effect, enabling power in the collection and assessment of evidence, and the rapid and secure distribution of material to commanders. American

6 Barton Whaley, *Codeword Barbarossa* (Cambridge, Mass.: MIT Press, 1974); John Ferris, 'The Roots of Fortitude: The Evolution of British Deception in The Second World War', in Thomas Mahnken (ed.), *The Paradox of Intelligence: Essays in Memory of Michael Handel* (London: Frank Cass, 2003).

7 Cipher A. Devours and Louis Kruh, *Machine Cryptography and Modern Cryptanalysis* (Dedham, Mass.: Artech House, 1985); Ferris, *Strategy and Intelligence*, pp. 135–80.

intelligence followed these leads. The United States, Britain and the Commonwealth applied more brains and resources to intelligence than the Axis, because they had more of them, and greater respect for its value. British and American signals intelligence services expanded in numbers by 3,000 per cent between 1939 and 1945, and pursued new forms of organization and technique. The Italians and Japanese stagnated. The Germans were good, but their enemies were excellent. In 1940, German signals intelligence personnel outnumbered British, but the tide turned fast. At their peak, 30,000 Germans worked in signals intelligence, thrice the strength of every such organization on earth during 1918. The British and Americans had 35,000 each, with better cryptanalysts and mathematicians, including the founder of computing science, Alan Turing, and perhaps a hundred times the power of Germany in data-processing machines applied to cryptanalysis. One story shows how the wireless war was won. In October 1941, without notifying their superiors, the machine cryptanalysts at Bletchley Park, mid-level figures in British code-breaking, directly told Winston Churchill that unless they received top priority for data-processing machines and personnel, attack against Enigma must erode. Within hours, Churchill gave them that status, 'action this day'; within months, Bletchley had the world's greatest concentration of such devices.[8] Conversely, the Germany navy's B-Dienst (*Beobachtungsdienst*), the best cryptanalytical agency of the Third Reich, never owned any data-processing machines, but could only borrow time on them from other bureaus. The German code-breaking agencies which had such machines used them to attack low-grade Western systems, which sought to preserve the secrecy of traffic only for twenty-four hours.[9] In contrast, Allied ULTRA attacked the hardest shells, because they shielded the richest meat.

ULTRA and its enemies

In intelligence, the Western Allies multiplied each other's strengths. German and other Axis agencies divided them. They competed not only against the enemy, but against each other. They could not transfer best practices, nor pool their power, acquire the resources their rivals did, nor understand the need to do so. They failed to exploit the weaknesses in British cryptography during 1941, and then slid behind all their enemies. Only the weakest

8 Hinsley et al. (eds.), *British Intelligence in the Second World War*, vol. II (London: HMSO, 1981), pp. 655–8.

9 Ferris, *Strategy and Intelligence*, pp. 164–8.

Axis Powers, the non-Fascist ones, Hungary and Finland, cooperated in intelligence like Britain, the United States, Canada and Australia did.[10] The cooperation between the Western Allies in intelligence was imperfect, but better than anything ever known before.[11] They worked to expand the common pool, honed by cooperative competition in the pursuit of common tasks. British services worked better with American ones than German agencies (or, for that matter, the United States Army and Navy) did with each other. Cooperation with the USSR was low, because it rejected Western overtures.[12] The Western Allies developed unprecedented power in strategic sources of intelligence, where the Germans were poor. German imagery never provided strategic intelligence against the Western Allies. Its coverage of the USSR never passed the Urals and collapsed in 1943. German spies against Britain, the USSR and the United States were controlled by its enemies. The payoff was most particular in signals intelligence. The Germans failed to attack high-grade American or British cryptographic machines because the task was hard, resources scarce, and only massive and centralized cryptanalysis could break them. This, the divided German system could not provide. One German cryptanalyst called a unified system 'a monster organization'. Britons named it Bletchley Park.[13]

Nor did superiority with intelligence end at collection. For every belligerent, strategic assessments and decisions were made by rational bureaucracy joined to charismatic leadership. British and American leaders made errors in such areas, especially regarding Japan in 1941. At worst, they were as bad as anyone, but better on average and unmatched at their best. Thus intelligence often spurred Churchill toward odd proposals. These problems were mitigated because he had unique experience with the use of communications intelligence, including against dangerous foes in wartime, and because his military advisors were tough and smart; while great collection provided good evidence, which was processed through flexible and thorough analysis. Churchill had strong opinions, but could change them. He made his subordinates consider intelligence, and he used ULTRA as a spur to action. From 1942, Churchill was harnessed to an open and highest-common-denominator

10 Chief, Army Security Agency, *European Axis Signal Intelligence in World War II* (Washington DC: Army Security Agency, 1946), (www.nsa.gov/public_info/declass/european_axis_sigint.shtml – accessed 22 October 2014).

11 Bradley Smith, *The Ultra-Magic Deals and the Most Secret Special Relationship, 1940–1946* (Novato, Calif.: Presidio, 1993).

12 Bradley Smith, *Sharing Secrets with Stalin: How the Allies Exchanged Intelligence, 1941–1945* (Lawrence: University Press of Kansas, 1995).

13 Ferris, *Strategy and Intelligence*, pp. 164–5.

system of decision-making, which combined the best of British and American approaches, with Britain handling the collection and analysis of intelligence and its use in planning, and both states driving strategy and action. Anglo-American leaders treated intelligence as essential to action. They emphasized the source best suited to provide these gains, signals intelligence, and accepted the need for specialized assessment and a rational process of decision-making. Good consumers even of mediocre material, their fare often was excellent.

Stalin and Hitler used intelligence in ways poorly suited to war. Neither wished to hear contrary analyses from subordinates, merely echoes of their own opinions. Both wanted intelligence to provide just facts, which they filtered through ideology, personal preconceptions and the belief that their will created reality. Stalin and Hitler, overconfident micromanagers, created top-down systems where they tried to control all actions. They liked to use intelligence to guide a strong hand, in a political game they could rig, against competitors unable to strike back. These characteristics did not rule war. The dictators were poor to mediocre consumers of good intelligence, let alone the mixed bag they received. They dominated intelligence analysis and strategic decisions in their states, crippling the capabilities of their subordinates.

Few leaders ever took intelligence, especially on internal threats, so seriously as Stalin. He directed intelligence chiefs in detail, shaping questions, integrating reports into policy, acting on knowledge. Stalin used intelligence not as a staff to lead his subordinates, but as a knout to rule them. It became lies, made to meet Stalin's demands, which he used to construct a world of his own. Before Operation BARBAROSSA, Stalin told his military intelligence chief, Filipp Golikov, that any reports about a German attack on the USSR were false, the product of officers trapped by British deception. Despite the personal risk, Golikov did present reports of danger to Stalin. On 22 June 1941, in any case, the world bit back.[14]

Within Germany, collection and assessment were divided between institutions which did not cooperate much, and dominated by the Führer's faith in himself. He cared less about intelligence than Churchill or Stalin, and received worse material. He saw as much communications intelligence each day as Churchill did, but it was inferior in quality, about diplomacy rather than strategy. When he received material to match ULTRA, he never praised the product or strengthened the producers. Hitler made effective use of

14 David Murphy, *What Stalin Knew: The Enigma of Barbarossa* (New Haven, Conn.: Yale University Press, 2005).

communications intelligence when it was self-evident, addressed immediate concerns and he could judge its accuracy himself, as by pre-empting the Allied incursion into Norway of 1940, and Italy's defection in 1943. When he used intelligence after 1941, however, the sources mostly were weak, and controlled by his foes. So too, when possessing the initiative in operations, German fighting services used intelligence effectively, but less so when on the defensive, especially regarding strategic matters. Nor did Germans emphasize the improvement of intelligence, even when its quality was clearly eroding. They expected little, and increasingly got it. They underestimated the power of communications intelligence and overestimated that of spies. The more desperate the situation, the more Germans trusted agents controlled by enemies or forged by entrepreneurs who, like Karl-Heinz Krämer ('Josephine') in Sweden and the Klatt bureau in Bulgaria, made their material up, confusing all sides. Juan Pujol began as an entrepreneur, motivated by ideology, and ended as the greatest controlled agent in British deception, 'Garbo'.[15] German intelligence became a delivery system for disinformation to its leaders. Anglo-American leaders used intelligence better than those in other states, but their superiority lay in wanting the best, and pursuing it. Hitler and Stalin might have gained from an ULTRA: neither could have created one.

ULTRA was the greatest source of intelligence during this war, but never perfect. It took words straight from the enemy's mouth, but rarely were they straightforward. Its value differed with time and theatre. ULTRA became more successful and useful over time, but its history was replete with reversals of fortune. The Allies never read every important enemy message, or most of them. ULTRA was not the best source on everything; nor were technical achievements in cryptanalysis and battlefield success linked in a simple way. During the African campaign, ULTRA could have been most useful when it was technically most primitive rather than most mature, because of the conditions that governed operations. When ULTRA was most primitive, force-to-space ratios were low, as were both sides' strengths; hence victories with decisive consequences were possible. Intelligence helped Rommel to achieve some of them. By the time ULTRA became mature, from 1942, large and good armies were locked in prolonged and high-intensity struggles of

15 Thaddeus Holt, *The Deceivers: Allied Military Deception in the Second World War* (London: Weidenfeld & Nicolson, 2004), pp. 160–1; Robert W. Stephan, *Stalin's Secret War: Soviet Counterintelligence against the Nazis, 1941–1945* (Lawrence: University Press of Kansas, 2003), pp. 154–74; Vadim J. Birstein, *Smersh: Stalin's Secret Weapon: Soviet Military Counterintelligence in WW II* (Padstow: Biteback Publishing, 2011).

attrition on narrow fronts, comparable to those of the Great War, though more fluid. Even so, intelligence budged the balance of attrition toward the Allies. On the biggest of issues, enemy strength, deployments and intentions, the Allies were well-informed, while their enemies were not. The quality of Allied intelligence, and its superiority over the Axis, provided much certainty to Anglo-American assessment and planning, and let them use their forces with remarkable precision, against an enemy which increasingly was ignorant, uncertain and outgunned. When they held the initiative, the weaknesses in Axis intelligence were irrelevant, and their strengths in tactical collection counted. On the defensive, their strengths became irrelevant and their weaknesses a danger. As the power of the Third Reich declined, its chances for success hinged on deploying German elite forces to sectors the enemy would attack. There, supporting their weaker Axis allies, they hoped to stop enemy breakthroughs and force the Allies into costly and one-sided battles of attrition, thus moving toward strategic stalemate. This aim required Germany to guess where and when the enemy would attack; it did not do so. Instead, from Operation TORCH and El Alamein onward, Germans suffered a steady run of operational and strategic surprises at the hands of the Western Allies – and to a lesser extent at the hands of the Soviets after Stalingrad. German intelligence failed precisely when Nazi strategy most needed it to succeed. Given the material odds, however, Germany might have lost even had it possessed an ULTRA, and the Allies had not.

Intelligence and air power

Target acquisition for strike warfare involves attack by weapons against objects that their users cannot see, guided by command, control, communications and intelligence (C3I) systems which locate targets and guide fire. These technical and tactical matters drive power and strategy. When this phenomenon first emerged, between 1914 and 1918, C3I was stronger than the weapons it supported: artillery, with limited range, accuracy and power, attacking the hardest targets in the world, trenches and turrets, in exchanges against an enemy with equal capabilities. In strategic terms, this outcome sharpened the process of attrition by both sides at once. Twenty years on, revolutions occurred in operations and strike warfare, as forces exploited the opportunities enabled by C3I, guided by all sources, led by communications intelligence, traffic analysis and radar. Tactical and technological developments, manifested strike by strike, transformed the role of intelligence and air power for war, first aiding the Luftwaffe and then American and

Commonwealth forces.[16] In some cases, intelligence became target acquisition, and operations, strike warfare. Aircraft delivered distant and one-sided blows, of unprecedented weight and precision, reshaping the power of armies or navies, and the ways that they fought. Strike by aircraft and guns was central to land warfare, especially as practised by Anglo-American forces, through the quick and massive application of firepower, close support against soldiers and interdiction against soft and distant targets central to enemy power, like units on the move, logistics, communications and transport. At sea, the effect was revolutionary. Aircraft, based on ships and shore, became first-rate naval forces, gradually superseding guns and armour. To strike first might take a battle, and ambush or counter-ambush decide a campaign. Communications intelligence, backed by radar and traffic analysis, working through radio, aircraft, aircraft carriers and submarines, created new forms of maritime war, centred on distant and precise attack against soft targets – thin hulls or decks rather than armoured turrets.[17]

So, too, intelligence, allied to the emergence of electronic warfare, transformed strategic air war in an asymmetric fashion. The bomber could get through only at great cost. Traffic analysis and radar gave strategic air defence forewarning of assault and guided concentrations of force against all attackers, which fought blind. In the Battle of Britain, defenders smashed far larger numbers of attackers; so, too, over the skies of Germany, fighters contained bombers in a cost-effective fashion, until overwhelmed by air-superiority fighters.[18] Intelligence for strategic air offensives was harder to gather, and successful in only one case. Anglo-American forces integrated all forms of intelligence, especially imagery and communications intelligence, into command and bomb damage assessment for the Combined Bomber Offensive. By keeping a fair grip on the impact of raids, and the campaign, and the enemy's economy, intelligence boosted the effect and efficiency of complex operations, and moved the ratio of costs in strategic air warfare toward the attacker's favour during 1944–45.[19]

16 Brad Gladman, *Intelligence and Anglo-American Air Support in World War Two: The Western Desert and Tunisia, 1940–43* (Basingstoke: Palgrave, 2009).

17 Carl Boyd, *American Command of the Seas through Carriers, Codes and the Silent Service: World War II and Beyond* (Newport News, Va.: Mariners' Museum, 1995); Christopher A. Ford, with David Rosenberg, *The Admiral's Advantage: US Navy Operational Intelligence in World War II and the Cold War* (Annapolis, Md.: Naval Institute Press, 2005).

18 John Ferris and Evan Mawdsley, 'War in the West, 1939–1940: The Battle of Britain?', in the present volume; Donald Caldwell and Richard Muller, *The Luftwaffe over Germany: The Defence of the Reich* (London: Greenhill Books, 2007).

19 Robert Ehlers, *Targeting the Third Reich: Air Intelligence and the Allied Bombing Campaigns* (Lawrence: University Press of Kansas, 2009).

Intelligence in the West

The nearest-run intelligence competition of the war was fought on the Atlantic and Arctic Oceans and the Mediterranean and North Sea. These operations centred on raids, ambushes and counter-ambushes by flotillas, warships, submarines and aircraft. Britain was more exposed to attack than its enemies, and on the defensive, though the empire struck back on the Norwegian coast and in the central Mediterranean. Intelligence aided both sides simultaneously, in a one-sided struggle between navies. The Royal Navy outweighed its Italian and German enemies in strength, and also received American and Canadian aid. Intelligence was a tiebreaker in individual engagements, but across the board it aided both sides equally, which most helped the stronger navy.

Every British victory at sea stemmed to some degree from intelligence, sometimes because of fluke, as with the sinking of *Bismarck* in 1941, but mostly through system, as with the death of *Scharnhorst* in 1943, strikes on the Italian navy at Taranto and Cape Matapan during 1940–41, and ambushes of convoys in the Mediterranean Sea during 1941–43, and in the Norwegian Sea during 1944–45. These successes hastened Britain's aim to break its enemies, rapidly. Axis signals intelligence agencies, especially B-Dienst, won the wireless war for much of 1940–42, but not enough to win these campaigns as a whole. They backed aggressive German operations, sustained an Italian strategy of fleet in being, shaped the destruction of more British than Axis warships, and multiplied the power of U-boats. Yet at a strategic level, these successes were minor, even counterproductive. Pursuit of these objectives wrecked the German navy and smothered the Italian one, while Britain had battleships to burn. The entry cost to victory was high. Britain could take it. Simple sources of intelligence enabled Italian minelayers and frogmen to cripple the Royal Navy during late 1941, driving it from Malta, temporarily, so saving the Afrikakorps from strangulation. Neither the Luftwaffe nor the Italian *Regia Marina* exploited that victory. Within nine months, the RAF and Royal Navy, superior in force and intelligence, surged back to Malta, wielding a razor against Axis arteries. B-Dienst enabled Hitler to pre-empt an Allied attack on Norway in 1940. This action beat Allied strategy, but broke the German surface navy, which lost half its strength sunk and more crippled – heavier losses than those of Britain, which could better absorb them. Advance warning from communications intelligence, and tactical guidance from radar, traffic analysis and air reconnaissance, gave the Germans an edge against the Arctic convoys. Their force could hammer

and occasionally halt the convoys, but these battles consumed what remained of the German surface navy, at disproportionate cost. Intelligence successes lured Germans into operational failures.

The same story marked the central instance of intelligence in European waters. Allied intelligence veterans thought their finest hour was the Battle of the Atlantic, as do many scholars. This claim has truth, but misses two points. German intelligence matched that of the Allies, while this campaign was won more by strategic, economic and administrative factors than by battles. The campaign never neared its strategic objectives, to sink so much shipping as to stall the Allies. It merely inflicted a cost-efficient, but minor drain on Allied resources. The U-boat was beaten by its technical limitations and by Allied power, while both ULTRA and B-Dienst played low, secondary roles, partly because each constrained the other. Until 1943, any attack on convoys by U-boats overwhelmed the few escorts and destroyed many merchant ships. U-boats could locate and ambush twice as many convoys when B-Dienst was effective and ULTRA was not than when the opposite held true. B-Dienst bolstered German attacks during the happy times of 1940 and 1942, when its victims were least adequately defended, first across the Atlantic Ocean, and then in the Caribbean Sea, the Gulf of Mexico and off the Eastern Seaboard of the United States. In 1941, ULTRA saved several million tons of shipping and their cargoes – a useful, although secondary gain – by enabling admirals to reroute convoys away from U-boats. In 1943, when so many submarines were at sea that evasion was impossible, and convoy battles unavoidable, ULTRA, radar and traffic analysis enabled growing Allied naval and air forces to counter-ambush U-boats and to wreck their campaign with ease and efficiency. Britain deliberately sailed convoys at U-boats, to make them fight, and die. That victory was inevitable, if at greater cost, once the Allies decided to achieve it, while escorts remained a costly necessity until the war's end. Under these Western waters, as on them, Britain won the war handily and speedily, because its sea power was greater, while ULTRA contained its competition. That was all it had to do. By the time ULTRA crushed its competitors, Axis navies already lay dead in the water.

These successes at sea enabled others on the Continent. Continual access to German operational and logistical traffic gave the Allies an excellent and certain grasp of enemy capabilities, perceptions and intentions, despite gaps, as about armoured strength in France before the invasion of Normandy. Knowledge let Western generals use their resources efficiently and effectively, better than any before. It sped the operations which drove the Axis from Africa, and then aided the success of Allied forces in the most complex

and risky form of military operations. Allied amphibious operations hit the enemy like thunder at weak points and caught it by surprise, transforming the front, because German intelligence was incompetent and its command manipulated by British deception. When war began, Germany, with few agents in the British Empire, threw masses of untrained spies against its foe, hoping some would stick. Britain captured these agents and used them to pass masses of messages to German leaders, occasionally reaching Hitler, which were tailored to ease Allied attacks. Mastery over German intelligence and cryptosystems showed what the enemy expected and how it reacted to misdirection. Deception was the most precise and devastating form through which ULTRA damaged its enemy. Before the invasion of Sicily in 1943, and of Normandy in 1944, Britain deceived Hitler into thinking that the Allies would attack elsewhere. This success crippled the deployment of German forces before these invasions, ensuring that 33 per cent of their forces were in the wrong place – deception helped to keep many German formations from affecting the eighty-day Battle of Normandy. Intelligence and deception were fundamental to Allied success in those campaigns. Without these edges, the Germans might have deployed their forces in France or Italy so as to pin the Allies far longer in their beachheads, or else to force postponement of attacks. Once forces were ashore, however, that situation changed. Attrition could not be avoided in Europe. That war was dominated by a high-intensity clash between large and good armies on narrow fronts. In this struggle, intelligence aided the Allies, but not in a dramatic fashion. The rest was up to the men.

Intelligence on the Eastern Front

The effect of intelligence on the Eastern Front was constrained because tyrants who were military micromanagers, poor as strategists and consumers of information, dominated policy for both sides. Nowhere else in the war, or in history, was good intelligence used so badly, so often, as Hitler and Stalin raced each other to the bottom. This constraint most damaged Germany, which had superiority in intelligence to a greater degree and for a longer time, and more need for help. Preconception, and an idiosyncratic mode of military logic, drove Hitler's decisions. Intelligence was a tertiary factor, even when it matched ULTRA in quality. Hitler rarely mentioned signals intelligence as a source for his decisions on the Eastern Front, despite the high quality of the material available to him, though he often discussed human sources. His generals were better consumers of intelligence than he, many of

them good ones. Hitler precluded the German superiority in intelligence from aiding theatre-level strategy or producing illumination through deduction drawn from fragments, the areas where ULTRA most aided his enemies, and also reduced its value in operations. This superiority was useful only where Hitler's generals had autonomy, essentially at the operational level, where it reinforced their greatest area of superiority over Soviet forces, in mobile warfare, most notably from June to November 1941, January to May 1942 and December 1942 to April 1943. Such autonomy was common for two years, however, and intelligence also aided planning for the first phase of campaigns in the summers of 1941 and 1942. Hitler's attitudes imposed an opportunity cost, but his direct mistakes with intelligence (as against strategy) do not seem to have caused any fundamental failures in operations which his generals would have avoided before May 1943; until then, Stalin hampered his commanders even more in all of these areas. Nor did Germany's flagging performance in the field afterward suggest that greater, or complete, freedom to act on knowledge would have done much to stall the inevitable, despite Hitler's incompetence when he dominated strategy and intelligence during 1944–45. On the Eastern Front, intelligence multiplied German force, which demonstrates just how inadequate the latter was to the task Hitler undertook.

The USSR led the world regarding intelligence in peacetime, but that strength had little value for war. More than any other power, spies gave it strategic intelligence, but against allies rather than enemies. After 1945, Eastern and Western propagandists claimed that commissars had mined war-winning intelligence across the world, especially Berlin. In fact, Soviet intelligence after the purges was amateurish, making errors which wrecked its networks during the 1940s. Many of its sources were walk-ins, not veterans.[20] The German ones, often courageous naïfs, provided good material, but perhaps no more nor better than that which American, Czechoslovak and especially Polish agencies received from the military opposition to Hitler, which Britain also integrated into strategy far better than the USSR did.[21] Even so, spies provided less intelligence on Germany than ULTRA.

20 The most accessible source is Oleg Mitrokhin and Christopher Andrew, *The Sword and the Shield: The Mitrokhin Archive and the Secret History of the KGB* (New York: Basic Books, 1999). Key documents are available in Russian: cf. Victor Gavrilov, *Voennaia razvedka informiruet: Dokumenty razvedupravleniia Krasnoii Armii, ianvar' 1939-iiun' 1941 g.* (Moscow: Mezhdunarodnyi fond 'Demokratiia', 2008).

21 Allen Dulles, *From Hitler's Doorstep: The Wartime Intelligence Reports of Allen Dulles, 1942–1945* (University Park: Pennsylvania State University Press, 1999); Tessa Stirling, Daria Nale and Tadeucz Dubicki (eds.), *Intelligence Co-operation between Poland and Great Britain During World War II*, vol. 1: *The Report of the Anglo-Polish Historical*

The USSR largely ignored their reports. Spies among his allies did affect Soviet policy, especially by reinforcing Stalin's mistrust of them. Ironically, the British government (and his spies within it) gave him much valuable intelligence on Germany which the Soviets ignored, though it helped them before the Battle of Kursk.

In its main struggle of intelligence, at the operational sphere, the USSR began poor and became good, while its enemy declined from ability to mediocrity. Before Operation BARBAROSSA, both sides overestimated themselves and underestimated their enemy. Soviet intelligence was decent, but handicapped by Stalin's incompetence. German aerial reconnaissance, imagery and communications intelligence acquired crucial data across the western frontiers of the USSR. These successes were offset by errors of equal magnitude, which reinforced each other. Germans mastered the Soviet order of battle up to 500 miles behind its frontier, but were blind beyond. This failure, usually credited to the incompetence of German intelligence, actually stemmed from the power of Soviet security and the poverty of its technology. During the 1930s, the Soviet Union blocked any means to gather information in its territory, except from the radio traffic of its agencies. In 1939–41, precisely as the Red Army doubled in strength, signals intelligence, previously Britain's main source on the Soviet order of battle, and an excellent one, declined in accuracy. In 1941, Germany underestimated Soviet strength in divisions by 50 per cent, and Britain (with imperial intercept stations better positioned to take Russian traffic) did so by 25 per cent. Lack of wireless equipment in new divisions, radio silence and the Soviet use of low frequencies, hard to intercept from long distances, led foreign powers to miss much of the expansion of the Red Army and thus to underrate its size.[22] The Germans also grossly underestimated the quantity and quality of Soviet equipment, especially tanks, despite hints to the contrary. These errors marked a triumph of Soviet security, with a double edge. Security sapped the deterrent Stalin thought he had established; he knew his state was strong and assumed others did so. They did not. Though Hitler would have attacked had he known the real size of the Red Army, this underestimate affected that decision and, even more, the confusion of August 1941, as Germans realized that BARBAROSSA had failed and agonized over how to win.

Committee (2 vols., Portland, Oreg.: Valentine Mitchell, 2005); P. R. J. Winter, 'Penetrating Hitler's High Command: Anglo-Polish HUMINT, 1939–45', *War in History* 18 (2011), 85–108.

22 Ferris, *Strategy and Intelligence*, pp. 128–9.

Early operational successes sharpened German edges in intelligence. Soviet intelligence, communications and command dissolved. The collapse of Soviet air power and signals security unleashed German air reconnaissance and imagery. Nazi communications intelligence briefly soared as high as ULTRA would go later for the Western Allies, reading the highest levels of enciphered material by army groups, and even more below.[23] Routinely, Soviet commands signalled in plain language, while codebooks were captured, enabling competent Finnish and German code-breakers to reach places Bletchley could do only through genius and power. The Germans received great opportunities to pass agents behind enemy lines, though they muddled those chances, enabling the enemy to turn these sources into tools for deception.[24] During the first two years on the Eastern Front, German operations gained from excellent intelligence, better than that of the foe, precisely what its system needed to work well. This advantage explains some of its startling successes of that period, though given its other advantages, intelligence sped manoeuvres, rather than transformed power.

Despite this edge in intelligence, Germany was not winning the war. The blunting of this edge shaped the decline in German military success. The quality of German intelligence began a constant slide, as its Soviet equivalent rose, the slopes intersecting in June 1943. As the Germans less often overran Soviet headquarters, they captured fewer codebooks, which reduced their operational superiority and the key to their cryptanalysis, in a vicious circle. Soviet signals security broke Axis access to high-level communications by mid-1942, and slowly pressed it further down. Far more than against the Western Allies, German signals intelligence penetrated middle levels of

23 For the older literature, cf. Volker Detlef Heydorn, *Nachrichtennahaufklärung (Ost) und sowjetrussisches Heeresfunkwesen bis 1945* (Freiburg: Rombach Verlag, 1985), and Albert Praun, 'German Radio Intelligence', in John Mendelsohn (ed.), *Covert Warfare: Intelligence, Counterintelligence and Military Deception in the World War II Era,* vol. VI: *German Radio Intelligence and the Soldatsender* (18 vols., New York: Garland Press, 1989), pp. 1–128. My assessments rest on post-war Allied interrogations of German signals intelligence personnel, listing work against Soviet cryptosystems (Chief, Army Security Agency, *European Axis Signal Intelligence*) and German communications intelligence reports from the Eastern Front, 1941–44, in RG 457/72, US National Archives. One interrogation, DF-112, AS-14-TICOM, Survey of Russian Military Systems, 1 April 1948 (www.scribd.com/paspartoo/d/85583814-DF-112-Dettmann – accessed 22 October 2014), and accounts by Finnish code-breaker, Errki Pale, *Suomen Radiotiedustelu 1927–44*, ed. Reijo Ahtokari (Helsinki: Hakapaino, 1997), describe German and Finnish success against the highest of Soviet military cryptosystems, including the five-figure codebooks, during 1941–42. The standard accounts of operations on the Eastern Front have not incorporated this evidence.

24 Stephan, *Stalin's Secret War*; and Birstein, *Smersh*.

Soviet command, which controlled tens to hundreds of thousands of men, especially during battles, but often illuminating operational intentions in advance. By 1944, however, it withered merely into traffic analysis, vulnerable to Soviet security and deception. Meanwhile, Allied air power, east and especially west, eroded and then ended German air reconnaissance and imagery. Soviet security controlled all Nazi spies on the Eastern Front, who passed misleading reports which German intelligence trusted. With low force-to-space ratios, on a vast front against forces growing in size, firepower and mobility, increasingly Germany could not discover Soviet intentions or deployments. German commanders treated this decline as a condition, rather than as a problem to solve. Hitler was happy to rely on intuition, combined with reports from any source, like deserters. The head of German military assessment on the Eastern Front, General Reinhard Gehlen, simply accepted that signals intelligence could not penetrate enemy intentions, and believed he could do so through intuition, reconnaissance by ground and air (despite their obvious limits in range), and especially agents. He overstated spies as a source, and did not realize how far the enemy controlled German ones, and manipulated his views. Through Gehlen's trust in spies, and his superiors' trust in him, Soviet deception twisted German decisions.

Soviet attacks before Moscow in December 1941 and at Stalingrad in November 1942, its greatest achievements of that period, were among the few where it achieved superiority in intelligence and deception. That superiority stemmed less from its skill than from German error, especially the general disbelief that the USSR could absorb such losses and assemble such replacements, and from Hitler's particular incompetence. In December 1941, surprise was absolute because German incompetence was so great. Commanders denied that Russians could recover from such devastating losses, and intelligence mostly missed Red Army preparations for attack. In November 1942, the Germans predicted and stalled every attack across the front except those around Stalingrad, where they underestimated the quantity, and especially the quality and intentions, of Soviet forces. Hitler resisted any claims of lurking danger. Gehlen misinterpreted signals intelligence about order of battle, but not capabilities and intentions – the concentration of Soviet forces around the Stalingrad salient – as indicating just a minor offensive. He did this because he underestimated Soviet power, and doubted the Red Army could attack there as well as at all the other places where indications of assault were obvious. Conspiracy theorists suggest that Stalin deliberately sacrificed these other operations to aid that against Stalingrad. The truth is more mundane. German intelligence was competent and Soviet

security and deception imperfect. Soviet commanders more thoroughly hid signs of attack before Stalingrad than elsewhere on the front, precisely because it was their main assault, involving the movement of great reinforcements in open terrain. In the classic manner, Soviet deception provided vague and erroneous indicators of every offensive except that around Stalingrad, which they hoped to hide through silence. Soviet intelligence was competent regarding the Axis order of battle, but underestimated German numbers at Stalingrad, and the quality of their forces across the front.

In neither December 1941 nor November 1942 did success with intelligence and deception guarantee victory. In most other cases before Kursk in 1943, the Soviets lost that struggle. Their signals intelligence and imagery were elementary, while those of the Germans remained good. The Soviet operation around Kharkov in May 1942 caught the Germans by surprise, and disrupted their strategy, yet failed disastrously. In July, the German attack in southern Russia instead of against Moscow took the Soviets by surprise and nearly caused another disaster, because their intelligence was poor and German deception effective. However, German intelligence and operations failed to stop Soviet forces from running away to fight another day, at a town called Stalingrad. Until March 1943, German attacks and counter-attacks usually surprised the Red Army. In the chaos of mobile operations, Soviet communications, intelligence and command collapsed, while the German ability to intercept messages between generals in low-grade codes or plain language multiplied their edges in generalship and manoeuvre, to devastating effect. Von Manstein's fabled successes of 1943 rested on good and superior intelligence, well used.

After Stalingrad, the Red Army painfully rose in intelligence, security and deception, as in all areas, each success multiplying the effect of the rest. Superiority in intelligence particularly reinforced skill in command. The deluge began at Kursk, where Soviet intelligence became good, and better than that of the Germans, who, for the first time, abandoned efforts to cover a summer offensive through surprise. Thereafter, Soviet air reconnaissance and imagery became competent, while human sources behind the front were outstanding. Signals intelligence became at least mediocre, outmatching that of the Germans. The loss of 8 million men by 1943 taught Stalin and his generals how to use intelligence, once they had the initiative, while Hitler, a poor consumer of evidence, increasingly controlled German operations under worsening circumstances. In order to win the intelligence struggle, the Red Army needed a good picture of enemy forces. It had an excellent one, because virtually all German divisions stood on the front, easily located.

Generally, Germany grasped enemy capabilities and intentions immediately on its front, but 90 per cent accuracy was a failing grade. It had to know the locations of all assault formations, aircraft and armour, deep in the rear, and track their deployments and intentions. The Germans underrated the quality and quantity of Soviet forces and the skill of its command, and failed to follow enemy movements to the front. Soviet deception hid precisely those matters. What the Russians call *maskirovka* (a term combining the meanings of the English words 'camouflage', 'deception' and 'security') rested on security, camouflage, misleading patterns of wireless signals and the spreading of rumours among Soviet troops, augmented by passing disinformation through controlled agents – by this stage, Germany's main source for strategic and operational intelligence. From summer 1943, Germany increasingly fell victim to enemy intelligence and deception, which found weaknesses in a Nazi force stretched out on a long line, and which meanwhile hid key Red Army redeployments from rear to front, and the timing and weight of Soviet attacks. Sometimes the Germans detected and exploited signs of attack, but mostly they did not.

During the last year of the war, intelligence and deception helped the Soviets against the Germans, as much as they did the Western Allies. Routinely, Soviet attacks struck German divisions with 1,000 per cent more forces than their defences were tailored to handle, and leveraged tactical breakthrough into operational triumph. Thus, before June 1944, German intelligence and commanders misread Soviet strategy and missed the redeployment of 400,000 men and 3,000 tanks into Belorussia, misjudging an attack that ate an army group and wrecked the front within weeks. Intelligence and deception helped to destroy more German forces on the Eastern Front than in Western Europe, but given the quantity and quality of forces on the fronts, it mattered less than ULTRA, and its impact was outweighed by German successes in those areas.

ULTRA in the Pacific

Across the Pacific, ULTRA of lesser quality than in Europe enabled greater operational triumphs, because conditions on the battlefield gave intelligence a more dramatic effect. Intelligence affected this war more than any other in history. Radio dominated communications for small forces scattered over millions of square miles. Prisoners and agents were less useful sources than usual; signals intelligence, radar, imagery and captured documents more so. In these disciplines, the Japanese were poor and their enemies good.

Japanese plans hinged on deception, knowledge, surprise and shaping enemy perceptions with precision. This approach worked when intelligence was good, as in December 1941, but not when it was poor and inferior to that of the foe – as from March 1942. Beyond the tactical realm, the main Japanese sources were Allied press communiqués and captured documents, followed by low-grade signals intelligence. Force-to-space ratios were low, most elements of either side rarely were in contact with the other, and their dispositions were masked. Rarely has possession of the initiative produced such power. Unexpected blows were hard to handle – weeks might be required to redeploy naval or air forces from one base to another; months to build the infrastructure necessary to maintain large forces in a new area or to move soldiers by sea or land. To destroy 20,000 men or 200 aeroplanes, capture one base or outmanoeuvre two divisions, transformed operations in New Guinea, a theatre the size of the Mediterranean. The opportunity to concentrate against the enemy's weakness, to catch it by surprise and to profit from knowledge of its intentions, were unusually large, especially for amphibious assaults. Failures in these areas were unusually expensive. ULTRA gave American power a razor, by showing how to execute lines of strategy, where to begin operations, how to force the enemy into error and prevent it from returning the favour. Poor signals security and intelligence, imagery and radar left Japan vulnerable to surprise, defeat in detail and loss of the crucial initiative.

Intelligence was fundamental to the battles between May and December 1942 which crippled the Imperial Japanese Navy and stemmed its tide. The USN in the Pacific was heavily outnumbered by a good enemy, but excellent intelligence and command let it concentrate its strength against fractions of Japan's fleet. Intelligence let bold American leaders use their forces to ambush Japanese fleets twice, in the Battles of Coral Sea and Midway, in one case scoring a tie and in the other a triumph – the exchange of four Japanese for one American carrier, after which the USN no longer was outnumbered. In both cases, the USN also shattered the enemy's strategy. Then, by the seizure of the island of Guadalcanal, intelligence enabled the Americans to make the Japanese fight, under disadvantageous circumstances, a prolonged struggle of attrition in the Solomon Islands, well-suited to the USN's strengths and Japanese weaknesses. This process culminated in a terrible campaign of maritime interdiction, where signals intelligence guided small forces of American aircraft and submarines precisely onto Japanese vessels over a large area. Throughout these campaigns, Japanese and American forces were evenly matched; intelligence was the tiebreaker.

One might have expected the significance of intelligence to wane in the Pacific after 1942, since American military superiority over Japan rapidly rose. That was not so. Intelligence gave little help to Allied operations on land in 1943. During 1944, however, it helped the United States to sidestep Japanese hopes to lure its enemy into a war of human attrition, and instead to shatter the outer perimeter of their defences in New Guinea and the Marshall Islands, and then the inner one in the Philippine Islands, luring what remained of Japanese naval and air forces to annihilation in the battles around Leyte Island in October 1944. The island-hopping strategy, which broke Japanese defences on the cheap, was possible only because intelligence showed how to strike where the enemy was weakest. From December 1944, however, the value of intelligence in the Pacific fell sharply for operations, though it remained influential for strategy. In particular, by revealing the strength of Japanese forces around the intended invasion sites in Kyushu, and the unwillingness of their government to surrender on Allied terms, intelligence drove the United States to use atomic bombs against Japan.

Conclusion

The United States won the Pacific War because of the quality of its forces and commanders and the scale of their resources, but intelligence let it win far more speedily and cheaply than could have happened otherwise. The same was true for the Allies in the Second World War as a whole, though to a lesser extent, varying by theatre and complicated by Axis successes, especially the great but overlooked ones against the USSR. There were many causes for Allied victory. To judge how any single factor shaped this outcome is hard, especially one like intelligence, which worked in such complex, often contradictory ways. Its effect is a matter for speculation, counterfactual logic and an attempt to winnow the effect of one cause from a complex process. The best-known effort is the 'conservative estimate' by F. H. Hinsley, a leading analyst at Bletchley Park during the war, and chief editor of the official history of British intelligence, that ULTRA saved the Allies three to four years of war and huge expenditures in lives and resources. His case focuses on the superiority of ULTRA to its German equivalent, its centrality to the Battle of the Atlantic, and of the latter to the war. One might reply that this case overestimates ULTRA's contribution to the U-boat campaign and of the latter to the war, and overlooks the Eastern Front. It also defines the value of Allied intelligence by adding its victories

and ignoring its defeats – and also ignoring the enemy.[25] If one counted the results from all clashes between swords and shields between 1939 and 1945, conversely, one might conclude that victory in intelligence shaved a year and tens of thousands of Allied lives from the Pacific War, and months and hundreds of thousands of Allied soldiers from that in Europe. Did ULTRA hasten victory by months, or more? Did intelligence slay its thousands, or hundreds of thousands? The question, 'How many divisions had Bletchley Park?', cannot be answered definitively. It must be asked.

25 F. H. Hinsley, 'British Intelligence in the Second World War', in Christopher Andrew and Jeremy Noakes (eds.), *Intelligence and International Relations, 1900–1945* (University of Exeter Press, 1987), pp. 217–18.