STRATEGY RESEARCH PROJECT

TANNENBERG: THE FIRST USE OF SIGNALS INTELLIGENCE IN MODERN WARFARE

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ABSTRACT

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The battle of Tannenberg on 27-30 August 1914 led to a major German victory over Russian forces at the onset of World War I. Wireless radio was still a new technology. While many factors contributed to the Russians' disjointed invasion of Prussia, key to the German victory were intercepts of Russian communications to include detailed operational and tactical orders.

This paper will review some of the events leading up to the battle then center on the battle itself examining the role of signals intelligence as a force multiplier. Relevant lessons learned that remain applicable to today's military will be highlighted.

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ACKNOWLEDGEMENT

It is with great appreciation that I acknowledge the assistance of the Military History Institute staff in the research for this paper. Without their diligence and determination I would not have been able to obtain many of the resources' English translation. Also, great thanks go to Professor Brian Moore, Colonel, USMC (Ret) who first steered me toward this subject after three previous ideas failed to reach maturity. His vitality and enthusiasm set the foundation for my interest and passion for this subject. If there had been time, we could have authored our own book.

LIST OF ILLUSTRATIONS

TANNENBERG: THE FIRST USE OF SIGNALS INTELLIGENCE IN MODERN WARFARE

"Nobody won the battle. It developed entirely by itself. The Russians sent out their wireless 'in clear.'"

—General Max Hoffman

"It is true that we had an ally that I can talk about after it is all over - we knew the enemy's plans."

—General Max Hoffman

PRELUDE

Signals Intelligence was not new to warfare in 1914. The capture of messengers, the interception of written plans or messages through signaling devices, deciphering smoke signals, etc., have all been tried and true methods of divining an opponent's intentions. At times such information has been critical to success or failure of battles, campaigns and wars. Russia's invasion of Eastern Prussia at the beginning of World War I was such a time.

Guglielmo Marconi obtained his first patent for an elementary radio set in 1886. By 1900 he had perfected the ability to tune signals and widespread use of his device ensued. Russia and France began daily communications by radio in 1912. One year later the Germans were intercepting, translating and decoding those transmissions.[1] It was also through intercepts that Germany received its first true indications of a partial Russian mobilization prior to the onset of hostilities.[2]

There are many reasons why the Germans defeated the Russian invasion of East Prussia in August 1914. Those reasons range from superior information through disobedience of orders on both sides to personal enmity between friendly commanders. The number of reasons equal the perspectives of the participants and historians, however one item they all agree upon is the superior information possessed by the Germans and its lack among the Russian forces. Signals intelligence was Germany's key information source. Added to the other factors of the buildup leading to and during the battle its foundation role is immediately evident. However, caution against making signals intelligence a panacea is warranted. The logical analysis of communications and effective counterforce maneuvers were the defining elements of the German 8th Army's decisive victory. Had German leadership been less discerning or had the Russians been able to devote men and materiel toward their own signal interception effort, the Russians may well have been the victors of Tannenberg. This paper presents only enough of the overall situation leading up to the battle of Tannenberg and the details of the battle to

examine the reason signals intelligence was able to assume a pivotal role. It is beyond the scope of this paper to examine in detail the mobilization and operational solutions the Russians selected to their problems and the choices that might have led to a different outcome. However, it is a poignant topic rich with lessons relevant in all times.

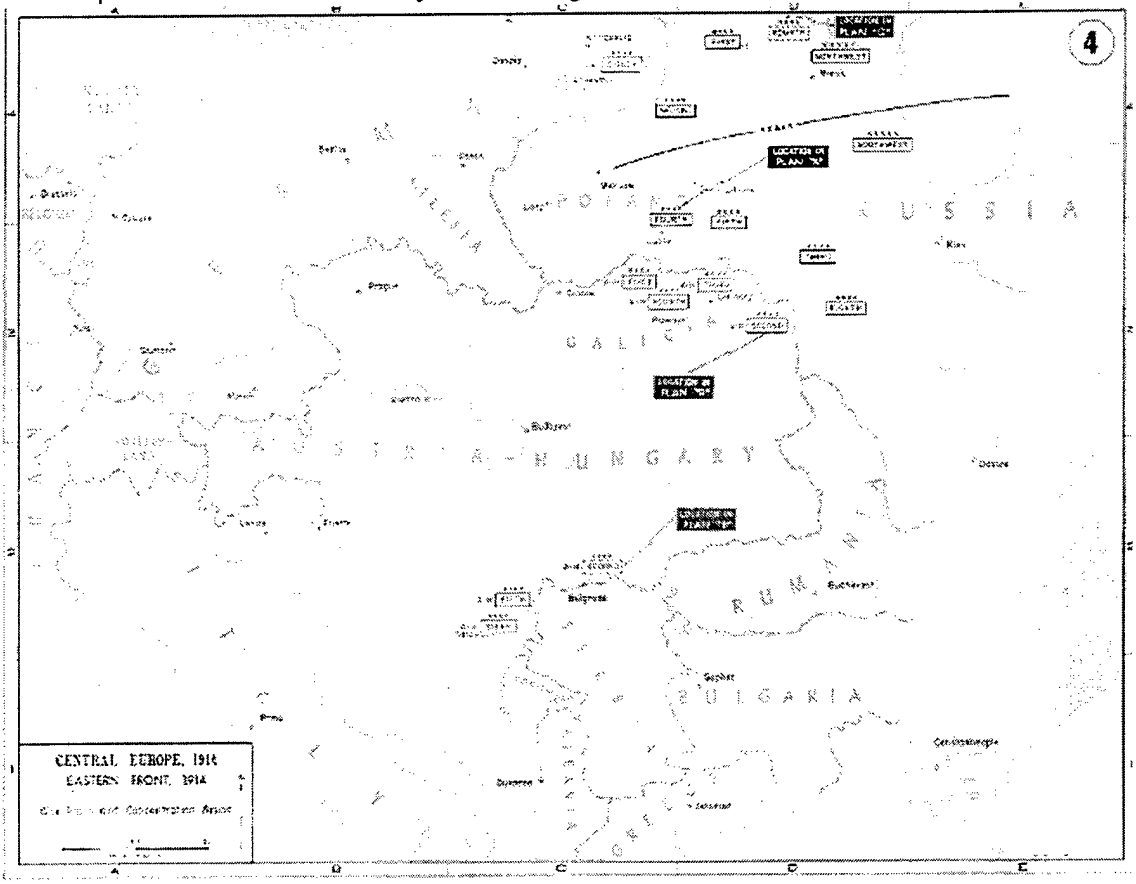
BUILDING TOWARD TANNENBERG: THE RUSSIANS

Archduke Franz Ferdinand was assassinated at Sarajevo on 28 June 1914. By 25 July 1914 Serbia had already rejected an ultimatum by Austria and ordered General Mobilization of its armed forces, leading Russia to order a partial mobilization. With confirmation of Russia's mobilization by deciphering intercepts between Moscow and Paris, the German leadership became convinced that war was inevitable. The maxim of the time was a mobilization once begun could not be stopped even if its principal wanted to do so. Tsar Nicholas II of Russia directed General Mobilization on 31 July 1914 in response to Austria mobilizing eight army corps near the Serbian frontier. Austria and Turkey ordered general mobilizations later that same day. One day later, on 1 August 1914, France ordered her general mobilization leading Germany to declare war on Russia. On 2 August 1914 hostilities began between France and Germany with Germany declaring war on France 3 August 1914. The last declaration for the Eastern Front is Austria-Hungary declaring war on Russia on 6 August 1914.

Russia managed to assemble its forces for the initial invasions into East Prussia and Hungary in sixteen days, surprising Germany who had not anticipated Russian movement for three weeks.[3] This was no small miracle given the size of the country, dearth of telegraph lines, poor roads and undeveloped waterway system. Russian soldiers were in the midst of traveling to their summer training camps requiring they be transported back to their garrisons where the necessary equipment was stored. Additionally, Russia had not built its railway infrastructure with the intention of meeting military requirements. For every 10,000 Russians there were .96 kilometers of railway compared to Germany's 11.5 kilometers.[4] Finally, many of the soldiers had to walk great distances over dirt roads, trails, or open country to a railhead where they could catch a train to take them to their assembly point while the Cossacks rode in on horseback. Motorized vehicles were in short supply. "In 1914, the Russian Army was equipped with only 679 vehicles - 259 passenger, 418 transport and 2 ambulances; only a further 475 could be expected by requisition from civilian sources. All transport forward of the railway was horse-drawn, causing blocks on the roads and slowing up movement."[5] Mobilization had its own rigid schedule, all events taking place in accordance with an inflexible timetable. Modifying it

was accomplishing the impossible. The Russians accomplished the miracle, but at a high price in materiel and men at Tannenberg.

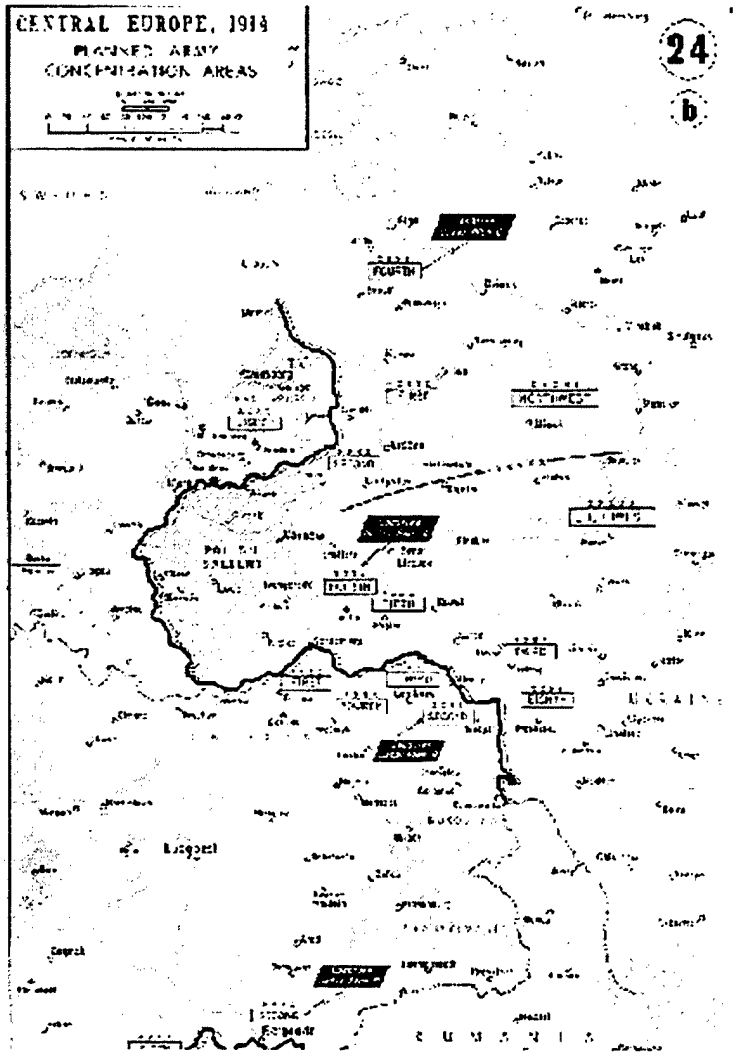
In the final meeting between the General Staffs of France and Russia in 1913, Russia promised to mobilize 800,000 men and advance against Germany as soon as possible after its fifteenth day of mobilization.[6] Given the impediments to mobilization, it is surprising that promise was given, especially when the Russians did not expect mobilization to be completed until the twenty-first day at the earliest. In Western Europe, Helmuth von Moltke "the Younger," Chief of the German General Staff, was implementing his predecessor's plan for defeating France. Alfred von Schlieffen's plan to attack in the west while conducting a holding action in the east was not quite what he had envisioned; yet it was successful enough to cause the French envoy to Russia to plead on a daily basis for Russia to enter hostilities in order to relieve pressure on the French by threatening Berlin.[7] The Russian envoy to France's assessment of the situation supported his counterpart's appeal.



WAR PLANS AND CONCENTRATION AREAS

With Germany's violation of Belgian territory on 3 August 1914, Russia made the decision to alter its war plans and move early to remove as much pressure as possible from France.

Russia had developed two plans to cover what it anticipated would be the situation should war break out. Plan A ("A" for Austria) focused on the Austrian Army and the elements of the



PLANNED ARMY CONCENTRATION AREAS IN EAST PRUSSIA

German Army not involved in the offensive against France. Plan G ("G" for Germany) considered Russia being opposed by the main forces of both Austria and Germany. Mobilization would proceed in the same manner regardless of situation. Forces were apportioned according to scenario, the larger force altering position based on the threat. The only decision the Russian General Staff would need to make was which plan to activate when the time arrived. In 1914, Russia considered Austria its principal concern and proceeded accordingly. However, yielding to constant French pressure, it was decided to improvise a campaign against Germany as well with forces not already engaged. This led to a shifting of forces amongst all the armies, taxing the railways to a greater extent.

The result was the two armies sent to accomplish the invasion of East Prussia were under strength.[8] Between them the two armies should have had 304 battalions of first line infantry and 230 squadrons of cavalry. As it was, only a handful of their second line troops were ready for offensive action due to mobilization problems. This left the Russian First and Second Armies at just under eighteen percent of their full infantry complement once they began the invasion.[9] Their difficulties did not end with being under strength.

Russia's principal original plan, Plan A, drafted in 1910, envisioned engaging Austria's full strength and the portions of the German Army not involved in its main thrust against France. Committed to an Austrian offensive, the Russians had few resources to generate a drive into East Prussia, a last minute expedient by the Russian General Staff to assist France. In brief, there were two Russian armies, the First Army (also known as the Vilna or Niemen Army) on the right wing of the front under the command of General Paul Rennenkampf, and the Second Army

(also known as the Warsaw or Narew Army) on the left wing commanded by General Alexander Samsonoff. General Rennenkampf would attack on the right, slowly advancing, drawing as many of the German forces toward him, and then pushing them back to the Vistula River. General Samsonoff would circle to the south on the left side of the front, come up behind the German defensive forces and crush them between the two armies. It looked relatively like a simple, a time-proven method of operational employment; however, there were some significant challenges to overcome before exchanging artillery and small arms fire with the Germans.

The Russian commanders of both armies begged for more time to train the reservists swelling their ranks, some of whom had not mastered most basic military skills. "The Russian General Staff Academy taught only two manoeuvres after 1912-forward and back-and the men's tactical formations were also constructed on an understanding that nothing fancy should be attempted, or the men would end up as a panic-stricken mob milling around the field."[10] They complained about the lack of transportation, commissary units, uniforms, weapons, ammunition, and signal stores; the concentration of the troops they would advance with was more or less complete by 13 August 1914, yet supply services for them would not be setup until six days later. Lacking robust mechanical transportation, men would be marching and horses would haul wagons as well as being used by the cavalry for reconnaissance. Horses required twelve pounds of grain daily that would also need to be carried in case forage could not be obtained in East Prussia.[11]

Communications, key to the mobility demanded by their plan, was woefully inadequate. On Russian soil the armies would use the Imperial telegraph lines, but once on German soil they would be limited to their organic equipment since the Germans would destroy telegraph lines as they retreated. For example, the Warsaw Army had a handful of manual Morse Code machines, twenty-five telephones and a Hughes device.[12] The majority of the men did not know how to use the devices or understand how the substitution ciphers were used to code messages. Additionally, complete codes were not distributed to all the corps for fear of them being lost and/or captured by the Germans. Also, it took time to print and distribute codebooks and given the fact that there was a large degree of illiteracy among the enlisted men that made the codebooks virtually useless, there was little impetus to expend energy on producing them. As a result, all communications (telephone, telegraph, wireless, messenger) would be transmitted in the clear. Use of all these communication means would now be a calculated risk once the armies moved forward from their assembly points, but a risk they had to take. Without communication between the two armies a coordinated attack couldn't be accomplished nor could they exchange critical intelligence.

General Samsonoff's Second Army had a leadership crisis. His corps had been gathered from four Military Districts and all the commanders were strangers to him. The commander of the North-West Group, General Jilinsky, had taken the cream of the officers for his staff, including Samsonoff's Chief of Staff and corps commanders. Officers from other Military Districts who were unknown quantities replaced those officers. In addition their assignments were kept secret until they received their mobilization orders, so they were unprepared for their new positions. To make matters worse, the newly posted Samsonoff was unfamiliar with the invasion plan. The plan he was prepared to execute had him in reserve for the Southern Front against Austria.[13] Preparations were fraught with confusion. Despite the Russians' best efforts that confusion was to remain an undercurrent throughout the Tannenberg campaign.

There was also a leadership crisis between Generals Rennenkampf and Samsonoff. Many reports put it down as a violent altercation between the two during the Russo-Japanese War; however there is evidence that the altercation could not have happened on the date in question since Samsonoff was unavailable due to being hospitalized with a wound. What is more likely is that politics were involved and the two were part of opposing factions.[14] Regardless of the reason, there was enmity between them that would play havoc from mobilization until Samsonoff's death after the defeat of the Second Russian Army. That same hostility might have existed within both their staffs, since each had members of the opposing factions within them.[15]

Last, but certainly not least, was the line of attack and the ground the armies would have to travel. The route chosen through East Prussia around the Masurian Lakes was the quickest and, ostensibly, the most direct route to Berlin. The French needed the most immediate effect on Germany and the Russian General Staff believed this was how to cause it. What surprised the Germans was that the Russian invasion came through its most remote border region. One possible reason for taking this route might have been the concern of marching through hostile territory with unprotected flanks. Whatever the reason, in choosing this course the Russians disregarded the glaring negative aspects of the ground their troops would have to traverse within rigid timetables.

On the Russian side of the frontier with East Prussia, there are no significant natural features. As part of their defensive plan against German invasion, the Russians had allowed roughly a seventy-five mile stretch from Johannisburg to Soldau to deteriorate. Untended forested patches dotted otherwise sandy soil. With a sparse population, roads were dust tracks and marshy streams wandered in every direction. This was the barren territory the Russian armies would pass through on their way to invasion, a land hard on marching units and

unfavorable for horse-drawn artillery, carts and wagons. Winning the battle with the Russian desert-type environment while maintaining an ordered fighting force was the first challenge.

East Prussia had cultivated land, villages, and good roads that began at the end of the frontier. Stone farmhouses surrounded by stonewalls abounded, excellent for use by defenders. As they advanced, the Russians would encounter dense forests with heavily fortified German outposts and previously built up defensive positions. Marshes and sunken lakes running north-south made formidable obstacles. The Masurian Lakes stretched from Angerburg to Johannisburg, a distance of fifty miles. Narrow passages of land, easily defended, separated the lakes while forests and marshland butted them with banks over one hundred feet high. Coming from flat land the Russian' movements would be readily observed while the German defenders would be masked by natural obstructions. Added to this difficulty was the separation between the two Russian armies. Scarcity of solid land would continually restrict the Russians deploying their troops on a single line of march. Moving around the lakes meant a separation of one to two days' march in a straight line and the previously mentioned obstacles required circuitous routing. Communications would be crucial to retain a coordinated and effective fighting force not only between the Russian armies, but also within their own units.

GERMAN SOLDIERS ENTRENCHED AT THE MASURIAN LAKES

Enough arduous tasks faced the First and Second Russian Armies which would assist in countering their numerical superiority. Signals intelligence was to be one of the weights to tip the scales in favor of the German 8th Army defending East Prussia.

BUILDING TOWARD TANNENBERG: THE GERMANS

The Germans had all the advantages normally associated with defense: they knew the territory, their resources were close at hand, and they had prepared positions to fight from. Still, there was more to it than that.

The German General Staff had run exercises in 1891, 1898, and 1899 under the watchful eye of General Alfred von Schlieffen covering just such an invasion by Russia.[16] He believed it was possible to defend East Prussia against a numerically superior force and each exercise, with different enemy objectives, demonstrated it was possible. Not only that, but he demonstrated that attacking forces would be separated due to the natural terrain and lakes, so the way to defeat the invasion was to throw full weight of counterattack on the unit that came into range first then swing all effort into the follow-on force. Von Schlieffen made maximum use of the roads and railways to move his forces, denied the "Russian" armies frontal engagements by having the center withdraw while the rest of his forces ravaged their flanks, and used modern weaponry to create light, flexible covering and screening forces capable of rapid movement.[17] Lastly, he established fortresses in key locations to command large tracts of land and built up defensive positions that would not only stop the "Russians'" forward movement, but also turn them in directions he desired for future flank attacks. In essence, von Schlieffen had, over the course of his exercises, laid the template for the destruction of the First and Second Russian Armies years before they invaded. Regardless of the German commander on the scene, if that commander followed the lessons learned from the exercises he was practically assured of victory no matter what the Russians did.

GERMAN OBSERVATION POST NEAR MEMEL, EAST PRUSSIA

This did not mean that von Schlieffen took the Russians for granted. He had developed a contingency plan to withdraw to the Vistula River and ceded East Prussia to the Russians until victory was established in Western Europe where the decisive battles were to be fought.

Despite this, in his memoirs on the battle, Major General Max Hoffman (a Lieutenant Colonel in 1914) indicated that regardless of who was in command, following von Schlieffen's plan would have resulted in some degree of victory.[18] He noted that General von Prittwitz und

Gaffron, the first commander of the German Eighth Army opposing the Russian First and Second Armies, did not implement von Schlieffen's plan as it had been laid out.

> Count Schlieffen had again and again emphasized the fact that a success could be achieved only if the inferior German forces concentrated in East Prussia were so maneuvered as to take advantage of the lie of the country-*i.e.* the unavoidable cleavage of the enemy advance by the Masurian Lakes-and strike with all available strength at the first Russian army that came within reach. There is a certain tragedy in the fact that if the 8th Army had kept to the exact programme laid down by the gifted strategist they could probably have completely destroyed, in two energetic strokes, both Russian armies advancing on East Prussia. [19]

The Germans had a plan taking into account the difficulties the Russians would face, and how to exploit the fact that the Masurian Lakes would split their forces. The Russians, however, lacked a coherent plan.

This raises the question of what the Russians knew of von Schlieffen's plan for defense of East Prussia. Over the span of years it is difficult to believe they did not have some insight into the exercises he conducted and their results. If they did know through intelligence reports or diplomatic circles, why was nothing done to address the weaknesses of the Russian invasion and advise the two army commanders? Assessment from the Russian High Command's actions indicates detailed preparations and briefings were sacrificed in the name of speed. Getting soldiers in the fray to draw Germany's attention, in some measure, from France was the sole objective. The Germans disseminated von Schlieffen's plan through the chain of command whereas the Russians appeared to consistently withhold information until it was absolutely certain an individual required it.

The Germans had developed an extensive network of railways, roads, telephone and telegraph lines on the western side of the Masurian Lakes making it easy to pass time-sensitive information and rapidly maneuver soldiers to parts of the battlefield where they were needed. Von Schlieffen's plan was clear that maneuver was the key to overcoming the numerically superior enemy force and the lines of communication supported the flexibility required.

Fortresses were set up in Königsberg and Danzig that guaranteed resupply by the Baltic Sea if necessary. Königsberg was a double enceinte with twelve detached forts.[20] Any invasion force moving north of the Masurian Lakes would have to contend with them, as there was no route past them where the invaders' right flank would not be exposed. A fortress at Graudenz controlled a key juncture of roads and railways. The fortified position at Thorn that proved pivotal in General von Hindenburg's (who replaced the ineffectual von Prittwitz) entire East Prussian strategy due to its placement on the Vistula River where its thirteen forts, located on both sides of the river, protected the major railway juncture and detraining station in the area.

All of these would be key targets for the Russians to capture in order protect their flanks and use the German railways.[21] Von Schlieffen had ensured the price of attack would be high in men and time.

An added benefit was in the form of General Paul von Hindenburg. After retirement he studied East Prussia obsessively, learning the terrain intimately while formulating precisely how he would enact von Schlieffen's plan of defense. Von Hindenburg expected to be recalled to active service in the event of the anticipated Russian invasion and stayed ready to respond.

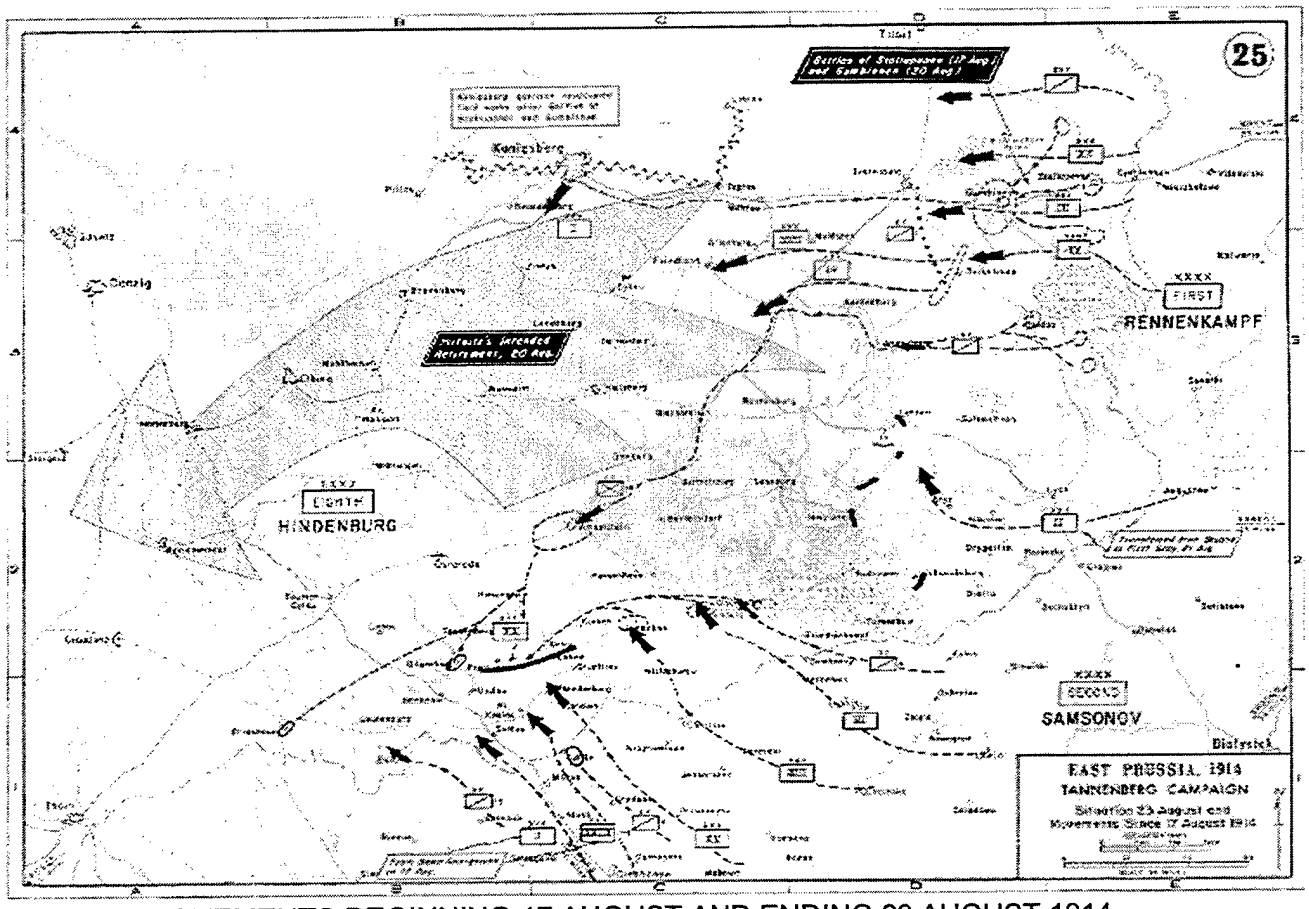
Problems were not absent from Germany's preparations. Yet they were minor and, in comparison with the Russians, easy to overcome since there was a plan everyone knew, eastern mobilization has been geared specifically for this contingency, and events moved along a reasonable time schedule.

BUILDING TOWARD TANNENBERG: THE RUSSIAN INVASION

Prior to the First and Second Russian Armies entering East Prussia, there were cavalry engagements of minor consequence in early August 1914. Both sides conducted raids across the frontier. Russian cavalry penetrated German territory in ever-increasing depths, but always withdrew across the border. Despite these forays they had little intelligence to relay to the armies prior to their advance. Along with much of the infantry, they had not been trained on how to carry out reconnaissance. Additionally, the cavalry was not issued specific orders on what they were to do or how to do it. Orders would state they were to carry out reconnaissance in a designated area or protect a specific flank proceeding by a specific course. They failed to state the timelines and the axis of advance of the army to whom the cavalry should report to. This resulted in the cavalry failing to provide the intelligence and fighting support needed throughout the entire campaign. Lacking aerial surveillance (which the Germans had), this left the First and Second Russian Armies essentially blind to German activities.

In accordance with his orders General Rennenkampf's First Army crossed the frontier on 17 August 1914.[22] Specific instructions on timing were not given. What was dictated were the lines of operations, the corps' zones of advance, and where the corps would set up their headquarters.[23] There was no lateral communication between organizations, no cohesive concentration of units and no consideration for the location or size of German forces. As a result elements started their movements at different times and crossings were at early as 8 AM and as late as 2 PM. Along a thirty-five mile front this caused some disjointedness. Some units blundered directly into German forces taking casualties and becoming prisoners of war. During the evening the Germans withdrew after having disrupted the center of the First Russian Army.

Orders to the First Russian Army for 18 August 1914 were delayed until the early hours of that day due to the action the previous day and evening. Since the orders were sent late, the



MOVEMENTS BEGINNING 17 AUGUST AND ENDING 23 AUGUST 1914

army moved out later in the day. However, not all units received orders and stayed where they were. First Army units received orders for 19 and 20 August 1914 the morning of the 19th. The Germans received the orders, radioed in the clear, as well. The orders gave the front line to be occupied on 19 August 1914 as Uszballen-Karmohnen-Puspern-Sodehnen-Goldap, and that a general halt was to take place on 20 August 1914. Less than a week into the invasion the lack of rear services was already beginning to tell. Further, communications were backlogged and cohesion among the corps was deteriorating. General Rennenkampf had to break contact with the enemy and stand down to reorganize his army and attempt to meet its supply and commissary requirements. This meant that the Russians would be fixed in place for twenty-four hours, ceding the initiative to the Germans if they wanted to take it. At the same time the Germans also picked up indications that the Russian Second Army was on the move across the frontier. Following von Schlieffen's plan the question for the German 8th Army Commander,

General von Prittwitz, was could he strike the First Russian Army fast enough and defeat it before the Second Russian Army could reach a threatening position. General von Prittwitz supported an initial attack, against I Corps Commander's recommendation, then ordered a general withdraw back across the Vistula River. General von François, I Corps Commander, carried out his attack, but disobeyed withdrawal orders and continued to seriously damage units of the Russian First Army before he moved back to defensive positions. Signals intelligence had given him the advantage of knowing the Russian plans and being able to attack on ground where he had the advantage.

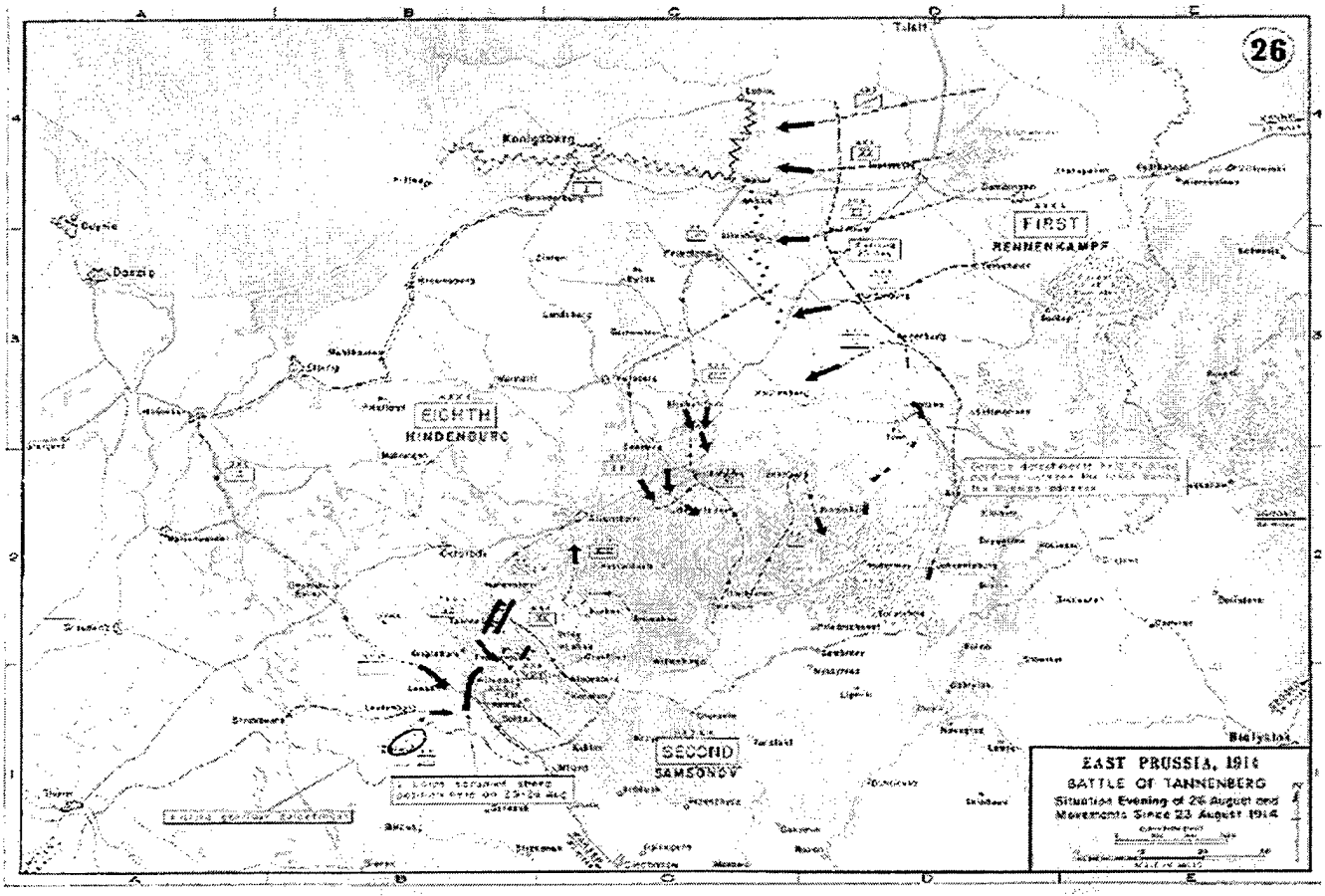
The stage was set for the battle of Tannenberg. As already noted, the Russians had numerous problems weakening the First and Second Russian Armies where the Germans could exploit vulnerabilities highlighted through signals intelligence. Interception of Russian signals would continue to be a force multiplier for the Germans. Before stepping into specific examples in the battle of Tannenberg waged by Generals von Hindenburg and Ludendorff, there is a telling incident prior to the battle that warrants special mention. Russian communications, as mention earlier, were fitful at best prior to beginning operations as the following example demonstrates.

> Just at the commencement of the operations of the Second Army an officer in charge of the Signal Service of the Ninth Army, newly formed at Warsaw, visited the central telegraph station at Warsaw on business concerned with the equipment of the Ninth Army Signals. To his horror he saw that a whole stack of telegrams addressed to the Staff of the Second Army was lying untouched in the central telegraph office of the town. These telegrams had not been sent on owing to the fact that direct telegraph communication had not been established with the Second Army, and that the subsidiary lines were completely blocked. This officer carried off the whole pack of telegrams and at once took them personally by car to the Staff of the Second Army. This disorganization resulted from the fact that neither essential personnel, apparatus and cable stores, nor the necessary number of labor columns were as yet at the disposal of the Second Army[24]

Such were the conditions in the Russian rear area. Once the Second Army passed into German territory where the cable lines were cut in advance of them, and lacking the cable to replace them, wireless communication was the only option other than messenger. With a separation between armies of not less than a day's ride, the latter was not practical. It was difficult enough to use messengers within the armies. The Russians, by sending tactical and operational orders over the radio in plain language, would give the Germans a significant advantage. The communication problem was never corrected, but it could have been if the Russians had made positive steps to do so.

TANNENBERG: THE BATTLE

General Rennenkampf entered East Prussia first with General Samsonoff following roughly three days later. General Rennenkampf's First Army was advancing slowly in



MOVEMENTS BEGINNING 23 AUGUST 1914 AND ENDING 26 AUGUST 1914

accordance with his orders to draw as many German forces to him.[25] General Samsonoff and his Second Army extended his forces further south than anticipated in order to facilitate his movement over difficult terrain and to flank the German forces before him. The separation in time and distance between the First and Second Russian Armies presented the textbook solution for defeat by the time Generals Hindenburg and Ludendorff (his Chief of Staff) arrived on 23 August 1914 to take command of the German 8th Army.

Why was von Prittwitz replaced? He was not implementing von Schlieffen's formula for success. Given Prussian discipline why was that? One item was the rapidity of information on Russian movements. Psychologically he was not prepared for how much and how fast he would know what the Russians were doing, and the need for equally fast decisions. The stress of making those decisions and what was at risk if he was wrong, weighed heavily upon him and

made him more tentative. What did not help was having an aggressive subordinate in Lieutenant-General Hermann von François who did whatever he thought appropriate despite the orders he received. The second item, and the most telling, is what he believed to be his main task. Von Prittwitz believed that von Moltke (the Chief of the German General Staff) wanted him to maintain a defensive posture. In his initial engagement with the Russian First Army von Prittwitz refused to take the offensive although ordered to do so . He then sent messages back to Berlin indicating he planned to withdraw to the western side of the Vistula River because the Eighth Army had insufficient forces. He went so far as to indicate that without immediate reinforcement he might not be able to hold the Russians at the Vistula.

The lack of aggressiveness and loss of confidence convinced the German General Staff that von Prittwitz had to be replaced in order to salvage East Prussian operations. Von Hindenburg, as he himself had concluded years earlier, was the logical replacement.

Besides Hindenburg's knowledge of the battlefield, Max Hoffman stated, "The task of the German Command was greatly lightened by the interception of the Russian wireless. Incredible as it may sound, the Russian sent their battle order 'in clear' from their wireless stations without reflecting that our stations, and more especially the main station at Königsberg, picked them up and sent them on to the High Command."[26]

Hoffman's criticism is well warranted, especially since the Russians were intercepting their own communications.

> For instance it was discovered that the XIII Corps was not in possession of the key for deciphering telegrams sent out by stations of the VI Corps. For this reason or for some other reason equally due to the disorganization of the Army Signal Service, Army Headquarters sent important operations order *en clair.* Our Brest-Litovsk wireless telegraph station intercepted a number of such telegrams, as for example No. 6318 of the 23d August from the Chief of Staff of the Second Army to the Commander of the XIII Corps, concerning the objectives of this corps; No 648 of the 24th August from the Chief of Staff of the Second Army to the G.O.C. the 2nd Infantry Division (of the XXIII Corps) concerning the objective of this division, and giving the whereabouts of the VI and XV Corps and the 6th and 15th Cavalry Divisions; No. 6346 of the 25th August from the Commander of the Second Army concerning Army Orders dated 25th August. The dispatch of messages in this way must of course also have been due to complete lack of training of the staff itself, but this very unpreparedness still further emphasizes the impossibility of an efficient accomplishment of that speeding up of the commencement of operations which was demanded of the army.[27]

Intercepting their own communications should have demonstrated to the Russians that the Germans were doing the same. Yet, the First and Second Russian Armies were never ordered to send only coded messages, possibly because of the aforementioned difficulties surrounding doing so. Regardless, they should have, at a minimum, been warned that their wireless

communications were in all probability being intercepted so they would have been more circumspect in their transmissions. Tapping of telegraph and telephone lines was already a common occurrence. Since the Germans were known to have been intercepting diplomatic transmissions in 1913, it is inconceivable that the Russians took the security of their message traffic for granted and/or made the assessment that the Germans lacked the personnel to scan the frequencies.

On 23 and 24 August 1914, the Germans intercepted orders from the Second Army to pursue retreating German forces who were, unbeknownst to the Russians, voluntarily withdrawing. Again, with knowledge of the Russians' intentions, Hindenburg and Ludendorff were able to control the placement and speed of the battle. Max Hoffman indicated the benefit of this information and how the Germans expanded its use.

> The enemy Commander, General Samsonoff, issues an order to the army to pursue. The order was sent by wireless from the Russian station, not in cipher, and we intercepted it. This was the first of numberless order that in the beginning the Russians sent, **with quite incomprehensible carelessness, unciphered; afterwards they were in cipher.** This carelessness greatly facilitated the control of the operations in the East, and **in many cases even made the initiative possible for us.** The cipher orders caused us no difficulties either; we had two men on the Staff who proved themselves quite geniuses in deciphering, and in a very short time they found out the key to the new Russian code.[28] (emphasis mine)

Max Hoffman's statement shows that at some time the Russians had been sending their messages encrypted. Precisely when they began transmitting in the clear has not been determined, but it appears to have been sometime before 19 August 1914 since the Germans intercepted Rennenkampf's standdown order for 20 August 1914 in clear text. The Russians might have been sending clear text messages before they crossed the East Prussian frontier.

The Germans had the capacity to monitor the Russians' preliminary movements well in advance. The question is, why they did not? The plan for East Prussia was rehearsed, mobilization went smoothly, and the German troops were well trained. That they did not utilize this advantage was a failing of the German 8th Army and General von Prittwitz.

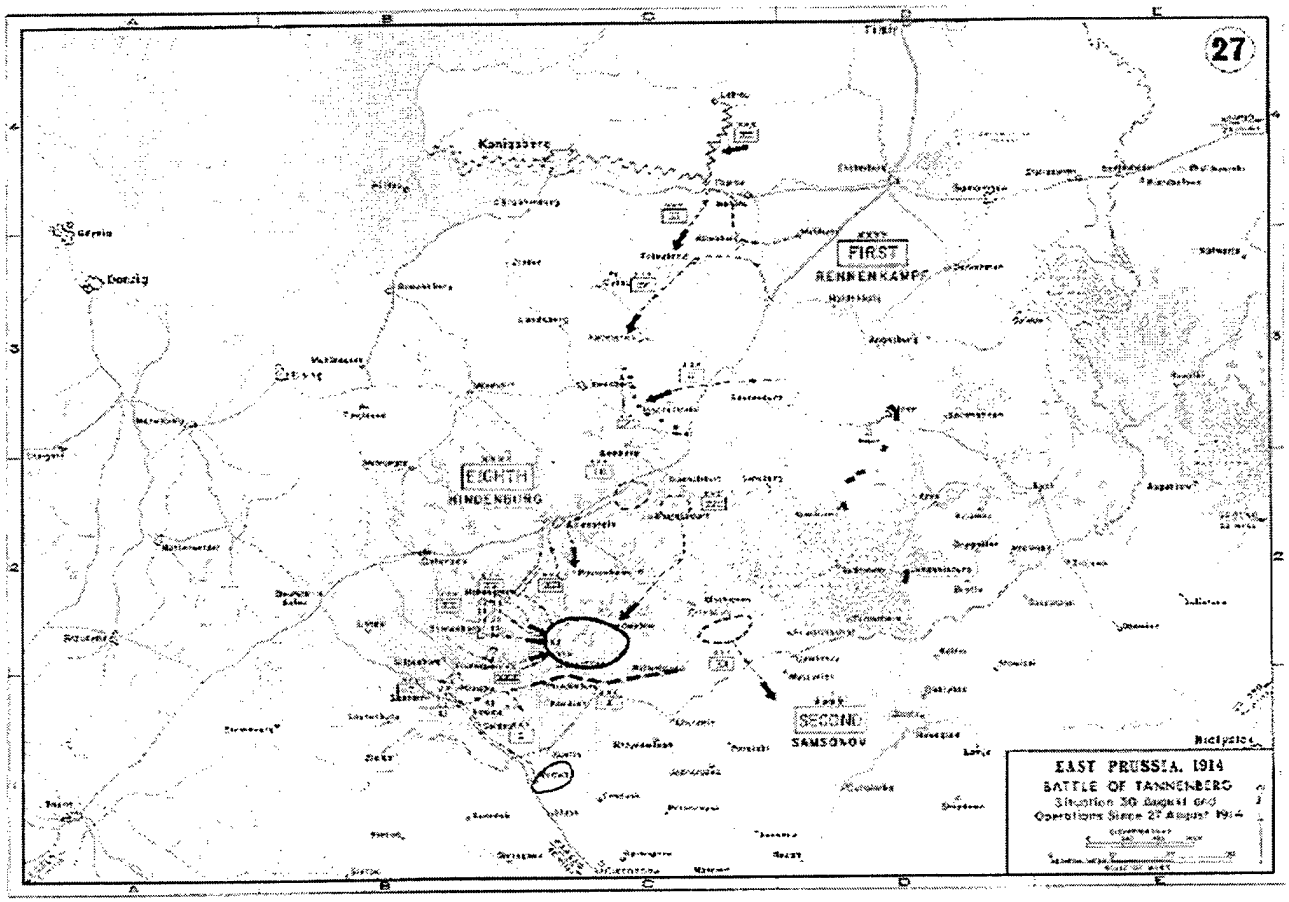
In theory the large permanent stations at places like Posen or Königsberg, manned by well-trained cadres of operators, should have found little difficulty in picking up and passing on the Russian messages. Reality was less impressive. German fortresses were officially responsible for monitoring their neighbors' broadcasts. Their successes had been mixed, and depended heavily on the availability of interpreters and knowledge of whether or not the broadcasts were in code or clear. From the start of mobilization moreover, the fortresses and the field signal units had a multiplying number of higher-priority missions. Neither instruments

nor operators could be spared to scan empty air. Interception of Rennenkampf's order was a corresponding piece of luck.[29]

PLACEMENT OF FORCES ON 27 AUGUST 1914

While much is made of the Russians transmitting in the clear the Germans were no less guilty of doing the same. They worried about the capture of codebooks and also had to balance speed against security and accuracy.[30] Like the Russians, it is reasonable that they concluded the probability of the enemy scanning the airways and stumbling across their frequency was remote. At worst, they, like the Russians, felt the risk of interception was lower than the loss of codebooks or a recipient not being able to decipher a coded message leading to chaos on the

battlefield. Luck, then, played a role in this battle since the Russian signals were intercepted and the Germans were not.



MOVEMENTS SINCE 27 AUGUST 1914 AND SITUATION ON 30 AUGUST 1914

The effect of the intercepts by the Germans was they kept the Germans ahead of the Russians' decision loop. The Germans knew almost everything about the Russian deployments, strengths, and plan of action, sometimes to a greater extent than the Russian army and corps commanders. Requiring continuous communications to effectively maneuver, and not realizing Russian messages were handing Russian plans and limiting factors over directly to the German 8th Army commander. Signal intercepts in the battle of the Masurian Lakes that took place after Tannenberg helped the Germans push the Russians out of East Prussia. The war was far from over, but the loss at Tannenberg pushed Russia closer to the Revolution.

LESSONS LEARNED

Tannenberg was the first time signals intelligence was used in modern warfare, but it was not the last. Lessons learned through that experience shaped how communications are protected, transmitted, and distributed.

Encryption and decryption of voice, and every other electronic medium, has become the "Holy Grail" of signals and intelligence organizations. Codebooks are distributed and strictly controlled. Some are made of materials facilitating rapid destruction in the event of them falling into enemy hands, a concern both the Germans and Russians had at the onset of World War I.

Under Operational Security, friendly communications continue to be monitored. However, the difference is the results of friendly communications intercepted having intelligence value are provided to the appropriate command structure to implement procedural changes. This includes the entire spectrum from telephones to e-mail, radio transmissions to faxes. The need for constant communication between organizations spread over thousands of miles vice the few hundred miles the Russian First and Second Army experienced has grown exponentially. The militaries of the present and the future will be more hampered than those of the past without communications.

What has changed is the assessment of risk in interception. Whereas it was a calculated risk that the enemy might intercept a message or two, it is now guaranteed that the enemy is collecting all transmissions and, with the use of high-speed computers, sifting them for intelligence value.

One area not explored at Tannenberg was the jamming of wireless signals. With the few devices available on both sides, and the various levels of training and understanding of the principals surrounding radio waves, it is not surprising. Even if the capability had existed, it is doubtful either side would have used it. The Russians most likely would not have had the equipment available. The Germans wouldn't have wanted to shut down their key intelligence source and/or let the Russians know they were being "listened" to. The same would have been true for "spoofing"[31] and "meaconing"[32] if communications technology had been that advanced in 1914. However, having already determined all the options the Russians could take and having developed counters to each, there was no imperative for the Germans to interject new variables.

Using signals intelligence is a force multiplier and, as Max Hoffman stated, can allow the user of it to gain the initiative. Still, the knowledge that there are other factors affecting its use must never be discounted. Even Hindenburg and Ludendorff wondered at one point if the Russians were providing them with false information.[33]

Tannenberg was truly won by the foresight of von Schlieffen's exercises, von Hindenburg's obsession with the defense of East Prussia, the disobedience of commanders on both sides, and the Russian armies moving before they were truly prepared. Signals intelligence lowered the cost for the German 8th Army, and provided greater benefits than its cost, a cost ratio that remains valid today.

WORD COUNT = 6568

ENDNOTES

[1] Dennis E. Showalter, Tannenberg: Clash of Empires (Hamden, Conn: Archon Book, 1991), 95.

[2] Ibid.

[3] Francis Whiting Halsey, "Vol VII: Russian Front August 1, 1914-July 20, 1919" in The Literary Digest History of the World War (New York: Funk & Wagnalls Co., 1920), 7.

[4] General Basil Gurko, War and Revolution in Russia 1914-1917 (New York: The MacMillian Co., 1919), 4.

[5] Geoffrey Evans, Tannenberg: 1410:1914 (Harrisburg: Stackpole Books, 1971), 58.

[6] Ibid., 57.

[7] The French were also concerned that Russia would allow concerns with Serbia and Austria to lessen its interest in Germany who France considered the principal antagonist.

[8] A Russian Infantry Division consisted of two infantry brigades, each brigade having two regiments, each regiment four battalions, and one artillery brigade of six batteries, each battery having eight guns. The division totaled approximately 20,000 men, 14,000 rifles and 48 guns. A standard rifle brigade consisted of four rifle regiments, each regiment having two battalions. Its artillery consisted of one rifle artillery division of three batteries, each battery having eight guns. The rifle brigade totaled 9,500 men, 7,000 rifles and 24 guns. A standard cavalry division consisted of two brigades each having two regiments and each regiment six squadron for a total of 4,500 men, 3,500 sabers and 12 guns.

[9] Troops were needed to accomplish rear duty tasks until the second line troops arrived. Also, the population of East Prussia was hostile to the Russians, requiring more first line troops to be siphoned off to guard depots, bridges, rail lines and troop detraining stations. Final available strength on 14 August 1914 for the First and Second Russian Armies was eighteen first-line infantry divisions, two first-line rifle brigades, eleven second-line infantry divisions and eight and a half first line cavalry divisions.

[10] Norman Stone, The Eastern Front: 1914-1917 (New York: Charles Scribner's Sons, 1975), 45.

[11] For motor transport there were approximately ten automobiles and four motorcycles available, all suffering maintenance problems and lack of fuel.

[12] A telegraphic device created by Eduard Hughes in the United States in 1855. It was able to print letters of a dispatch making the paper advance toward a wheel of type, so every character could face the paper properly. In essence it was similar to the one of the old drum typewriters. A dial transmitter sent the current necessary for the printing mechanism, and a keyboard needed to be synchronous with a crank, which pushed the type to the printer. It printed approximately 1200 words an hour.

[13] Lt. Col. Hermann Von Giehrl, "Some Light on Tannenberg from the Russian Side," Knowledge and Defense 2 (1922): 6.

[14] The Russian army was rife with factions, cliques and rivalries. Rennenkampf was identified with the opposition to the War Ministry led by the Grand Duke Nicholas while Samsonoff backed the War Minister, V. A. Sukhomlinov.

[15] The two generals' Chiefs of Staff's viewpoints were opposite to their bosses. If they let personal opinions rule their actions, the senior staffs of both armies would be constantly under internal tension.

[16] Showalter, 32-33.

[17] It is said that von Schlieffen was inspired by the success of Hannibal using the same tactics at the battle of Cannae. This is the reason discussions of Tannenberg invariably expand into comparison with Cannae.

[18] Hoffman, Maj. Gen. Max. War Diaries and Other Papers. Vol. 2. Translated by Eric Sutton (London: Martin Secker Ltd., 1929), 32.

[19] Ibid., 241.

[20] The fortifications encircling the town.

[21] The Russians also needed to capture German rolling stock to use the railways. Russian railroads used a gauge of five feet whereas the German gauge was four feet, eight point five inches. Without German rolling stock, extensive engineering would have been necessary for Russian trains to use German railways. Such engineering would take time the Russians did not have.

[22] He was instructed to cross on 17 August and occupy the line Willuhnen-Stallupönen-Germingkehmne-Dubeningkne-Kowahlen. Corps headquarters would be at Wladyslawow, Eydtkuhnen and Przerosl. Reports would be passed first to Vilna then Wierzbolowo.

[23] Owing to the dearth of telegraph cable, the orders specified communications would be via Imperial telegraph and where the headquarters would hook into it. Intercept of these types of orders would give the Germans targeting information if they wanted to take out the head of the Russian army.

[24] Lt. Gen. Nicholas N. Golovine, The Russian Campaign of 1914, trans. Capt. A. G. S. Muntz (Fort Leavenworth: The Command and General Staff School Press, 1933), 171.

[25] Rennenkampf had been sending continuous telegraph messages to Samsonoff to increase his pace and meet his objectives. Samsonoff had replied the he was contending with the difficulties of the sandy ground his men had to march through, the problem of moving his cannon and wagons, and the fatigue of his reserves not used to great distance walking. He was never able to recover the time he had initially lost.

[26] Hoffman, 333.

[27] Golovine, 172.

[28] Hoffman, 35.

[29] Showalter, 169-170.

[30] Ibid.

[31] Employing electronic or tactical deception measures

[32] A system of receiving radio beacon signals and rebroadcasting them on the same frequency to confuse navigation. Meaconing stations cause inaccurate bearings to be obtained.

[33] It was only after intercepting directives, their accompanying movement acknowledgements and actual sighting of the Russians where the transmissions stated they would be, that the two believed they were genuine.

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