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THESIS

THE COMMAND AND CONTROL OF THE GRAND ARMEE: NAPOLEON AS ORGANIZATIONAL DESIGNER

by

Norman L. Durham

June 2009

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The Grand Armee transited the European countryside with lightning speed as Napoleon out maneuvered his enemies. Napoleon's dominance was a direct result of his organizational masterpiece that was the Grand Armee. From an organizational design perspective, Napoleon's methodology applied the ideas of others and exploited existing technology to affect his design.

The reorganization of the military corps became one of the most important transformations made by Napoleon. The army corps was considered a key component in Napoleon's strategic deployments. The command and control system he engineered for his corps was essential in the Napoleonic philosophy to march divided and fight united.

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**THE COMMAND AND CONTROL OF THE GRAND ARMEE:
NAPOLEON AS ORGANIZATIONAL DESIGNER**

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TABLE OF CONTENTS

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LIST OF FIGURES

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I.   INTRODUCTION

A.   HISTORY

Napoleon Bonaparte was undoubtedly one of the greatest military minds of all time. As General, Consul, and Emperor he left an extraordinary record of success on and off the battlefields of Europe during the years of 1803-1815. This twelve-year span of Napoleon's military dominance became known as the Napoleonic Wars (Esdaile, 2007). Much has been written on the military tactics, techniques, and procedures developed and implemented by this great commander. Little has been said of his expert use of organizational design and the systems he engineered to ensure timely acquisition and distribution of essential information. This thesis explores this area of Napoleon's expertise.

Napoleon's appreciation and understanding of the military arts does not come by happenstance, his military education started at the age of 9, as he left Corsica and entered the French military school system. Here he was prepared for a career in the artillery. Napoleon was provided formal instruction in the rudiments of military science, mathematics, history, geography, and German (Horward, 1988). He spent his formative years as an artillery officer until destiny intervened on his behalf. While in Paris in October 1795, Napoleon was called upon to defend the National Convention from a mob of 30,000 Parisians (Horward, 1988). Napoleon was considered a hero of the government and was eventually appointed to be the commander of the Army of Italy in March 1796 (Horward, 1988). His star continued to rise and he would eventually become the First Consul, and later Emperor of the French.

Napoleon had inherited large conscript armies from the French Revolution. These armies were led by young ambitious commanders, accustomed to a mobile, offensive, and ruthless way of war (Rothenberg, 1978). He would inspire these soldiers with a fierce loyalty and devotion to France. Together they would win unsurpassed victories and Napoleon's strategies, campaigns, and style of command would be studied by

soldiers everywhere (Rothenberg, 1978). Napoleon transformed Europe and laid the foundation for the nineteenth century—politically, socially, economically, and militarily (Horward, 1988).

Organizational design is an example of a modern framework with which to make a critical examination of this 18ᵗʰ century genius. An inquiry into Napoleon's methodology of this framework would reveal that he pushed existing technology to the limits. At the same time he made its very limitations work for him. The effectiveness of Napoleon's organization depended on his ability to successfully disseminate data throughout his information network. Organizations acquire and internally disseminate information in order to carry out the critical functions of decision making and control (Huber, 1982). Napoleon utilized the existing technology of the Chappe's semaphore telegraph to improve his message traffic. He maximized its potential by constructing towers across Europe creating a communications web that would cover his expanding empire (Elting, 1988). When messages were too long or not as important to use Chappe's telegraph, Napoleon relied on the European postal system. He made improvements by creating an express courier service. Messages were carried in a lock box with a logbook that showed the date and time of arrivals and departures of couriers to each post house (Elting, 1988).

One of Napoleon's greatest organizational designs was the versatile corps system. Napoleon restructured its organization to contain every facet of an army. An army of 150,000 men could be organized into eight numbered corps, each containing every element of arms and each provided with a uniformly structured, but not necessarily permanent, staff to direct its operations (Van Creveld, 1985).

The command and control (C2) structure of the corps system developed by Napoleon was a simple hierarchical organization with Napoleon as its pinnacle. The corps was deployed such that no one corps was more than a one day march from another. Following contemporary military wisdom that no single corps of roughly 28,000 men could be overwhelmed in one day, allowing time for reinforcements to arrive in support (Elting, 1988). The smaller well spaced corps system also allowed for ease in logistics and foraging the European countryside (Van Creveld, 1985). Maneuverability of the

2

army was improved as the independent corps could take different paths to a rendezvous point. In contrast, other European military organizations of the day normally deployed their armies in mass, taking more time to reach a destination. Ultimately, this swift maneuverability allowed Napoleon to achieve many of his greatest victories (Clausewitz, 1812/1942). He was able to out maneuver many of his coalition enemies by isolating them and destroying them in detail. Napoleon's ability to out maneuver his enemies rested on his ability to engineer an organization that could support his innovative ideas.

This thesis will analyze the organizational design process, specifically how the principles of organizational design applied to Napoleon the organizational designer. Utilization of these organizational principles coupled with existing technology enabled Napoleon to create a vast command and control network that supported his dominance over his European contemporaries.

B.   OBJECTIVES

This thesis will investigate the command and control elements developed by Napoleon Bonaparte. The primary area of focus will be on Napoleon as an organizational designer. His mastery of the available technology and resources allowed him to achieve his great success on the battlefield. Through the lens of organizational design this thesis will examine the modern areas of organizational theory and design to better understand how Napoleon effectively developed his organizational structure. The objective of this thesis will not be to present another historical recount of Napoleon's many triumphs as a military commander. The intention will be to explore Napoleon's ability to develop organizational structures within the technological and human constraints of the period to outmaneuver his opponents.

C.   THESIS OUTLINE

The remainder of this work is organized as follows. Chapter II is a review of pertinent literature that will provide an overview of some of Napoleon's military engagements to best emphasize his organizational skills and achievements in effective command and control. This chapter will also discuss the basics of systems and

information systems engineering and highlight specific principles of organizational design. Chapter III will be a discussion on how Napoleon's interpretation of information systems engineering and organizational design guided his restructuring of the existing military corps structure. Chapter IV will cover the methodology and philosophy behind the Napoleon command and control network the benefits of being the ultimate authority on the design criteria. This chapter will also present three military engagements in which Napoleon achieved victory as a direct result of his design theory. Chapter V will be conclusions drawn from the analysis made on Napoleon's ability to apply organizational design concepts to command and control. This chapter will also attempt to present further areas for research and discussion in organizational design and command and control.

II.   BACKGROUND

This chapter will review important concepts and terminology that are needed to understand the organizational design process with respect to Napoleon's Grand Armee. Transformations Napoleon made were not typically the result of creation but organization. He applied what are now considered to be modern principles of information systems engineering to the ideas of others. In addition, this chapter will cover key elements of warfare and how they were affected during the time periods of the French Revolution and the Napoleonic Wars (1792-1815).

A.   KEY MILITARY CONCEPTS

1.   Command and Control (C2)

No single activity in military operations is more important than command and control (DoD, 2006). Without command and control an army would be subject to fighting a battle as a reactionary force unable to effectively maneuver and exploit tactical advantages during an engagement. Command is a function that must be exercised in order for an army to exist and operate. The Joint Pub 1-02, *Department of Defense Dictionary of Military and Associated Terms* defines command and control as, the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission (DoD, 2001).

The Napoleonic era ushered in a revolution that necessitated an alteration in military organizations' command and control. The dramatic expansion of armed forces through national conscription required a more logical and efficient means of controlling armies in the field and on campaign (Bruce et al., 2008). Napoleon Bonaparte had been quick to respond to these revolutionary changes. Napoleon had a heightened sense of

awareness to command and control created from his military training and assignments as an artillery officer. He knew that massed artillery during key moments in a battle could very well decide the outcome of that engagement (Clausewitz, 1812/1942). Decisive and effective command and control were paramount in exploiting this tactic on the battlefield. Most Napoleon scholars and historians of the period would agree that Napoleon had a very keen intellect that was considered by some to be border line genius (Rothenberg, 1999). His genius also included a vivid imagination that is present in many of his letters that survive to this day (Van Creveld, 1985). This imagination coupled with his self proclaimed love of mathematics and science were invaluable to his systematic restructuring of France's command and control structure.

2. Infrastructure

For the purposes of this thesis infrastructure is defined as the basic organizational structures needed to sustain a society, this includes roads, waterways, and lines of communication. Basic infrastructure throughout France and Europe had made great strides through the eighteenth centruy (Rothenberg, 1978). Vast amounts of new roads and canals were being built which facilitated travel and trade. A royal mail carrier service established in the sixteenth century had increased exponentially during this time period. Napoleon had estimated this allowed information and news to travel twice as fast as it had during the age of Caesar (Van Creveld, 1985).

In 1793, the Frenchman Claude Chappe had demonstrated a practicle use of the semaphore telegraph and had established a line from Paris to Lille (Elting, 1988). This telegraph line covered the 150 mile distance with the use of fifteen stations. In favorable weather, one sign could be sent in five minutes. The time needed to send a message was considerably reduced by encoding it so that each sign represented an entire word or phrase (Elting, 1988). This emerging technology was an area in which Napoleon tried to improve, as it would serve as a faster means to send and receive data throughout his command and control network.

There were also improvements in the field of cartography. Maps were now being created using mathematical triangulation which improved accuracy of the maps (Van

Creveld, 1985). For the first time ever maps of all sizes and qualities were made readily available, effectively improving the strategic planning process for commanders in the field.

Logistical support is a significant area that relies heavily on infrastructure. It saw vast improvement with the expanding road and canal systems. A shift in population density increased to the point where most regions could support the foraging of armies. Prior to the 18th century, population density's tended to orbit around major cities. However, during the 18th century the population density of the countryside increased to the point that many regions could support armies (Van Creveld, 1985).

Foraging was an accepted method Napoleon's soldiers used to gather food from a surrounding countryside. In contrast, the act of foraging was strictly forbidden in the British army and severely punished by Wellington. However, on occasion necessity forced Wellington and his officers to turn a blind eye to the practice (Rothenberg, 1978). The practice had developed into a highly effective system in the French army, and troops showed considerable ingenuity in finding supplies (Rothenberg, 1978). This decreased an army's dependency on magazines and convoys which improved the army's overall mobility (Elting, 1988). The concept of foraging was paramount for Napoleon's corps as they normally traveled independently, further decreasing the logistics demand from one given area.

3. Army Organization

One of the elements to Napoleon's success as a military commander was the adaptations he made in the organization of his armies. Armies of the Napoleonic era were roughly organized the same as they are today aside from the weapons and vehicles that modern technology has provided.

Prior to the French Revolution, France's military was organized much like the modern Army National Guard of the United States. The French military was organized into divisions in 1791. Each division was assigned to a specific region or territory and a general officer assigned to each division. These general officers were responsible for all

the troops and fortresses within their divisions and for the preservation of law and order if local civil authorities could not handle the situation (Elting, 1988).

The French Revolution created many social changes within the army. The title and birth right of nobility was forbidden by the National Assembly. The officer corps thoughout Europe primarily consisted of nobles or men who had attained noble stature or station (Elting, 1988). The reorganization of the officer corps within France had actually assisted up and coming officers such as Napoleon. The chaotic conditions of the revolution had advanced him in rank well beyond his years. In fact, the average age of the first eighteen marshals was only 44 (Horward, 1988). Napoleon's marshals had risen through the ranks and were not given assignments based on noble birth as was contrary to the European monarchys of the era. This gave Napoleon an edge as he developed his organization. He realized he could appoint marshals who were risk takers and would not shy away from combat. This advantage came at an extremely high cost as Napoleon suffered a higher mortality rate amongst his generals than those of his enemies (Rothenberg, 1999). Eventually, the overall effectiveness of Napoleon's organization was decreased due to attrition of experienced commanders in the field.

As in today's military organization the armies of France were organized into regiments, brigades, divisions, and corps. The brigade usually consisted of two or more regiments; a division of two or more brigades (Elting, 1988). The corps became the focal point for Napoleon's organizational adaptation. The corps system had been previously established by France's National Assembly in 1794. In 1799, Napoleon consolidated his political power becoming First Consul of France. He began to combine his divisions into army corps, a combination of infantry, artillery, and a brigade of cavalry, plus detachments of engineers, pontoniers(engineers that build pontoon bridges), and a staff (Horward, 1988). Details and breakdown of the corps sytem will be discussed further in Chapter III.

Another key element of army organization was the general staff corps. In 1792, the French National Assembly started assigning a chief of staff officer to its field armies. In particular, Marshal Berthier would excel in this role as he was assigned to the Army of the Alps. The future chief of staff for the Grand Armee, Berthier developed doctrine

which provided guidance on how to effectively operate as a General Staff (Van Creveld, 1985). The General Staff would serve as the backbone of Napoleon's organization and C2 network. Berthier would provide the blueprint for all staff officers on how to be an effective productive component of Napoleon's C2 system.

B. INFORMATION SYSTEMS ENGINEERING

1. Systems Engineering

Systems engineering is considered to be a robust approach to the design, creation, and operation of systems. The systems engineering process consists of identification and quantification of system goals, creation of alternative system design concepts, performance of the design, selection and implementation of the best design, and to verify if the design meets the criteria set forth in the goals of the system (NASA, 1995).

The fundamental goal of systems engineering is problem solving. The problem solving process can be described in three steps: *problem system, project system*, and *delivered system* (Marvel, 2008).

The *problem system* starts with the quantification of the goals, system requirements and customer needs (Marvel, 2008). One of the biggest engineering problems facing Napoleon was the scale of the command and control network he set out to design. Prior to his appointment as First Consul of the Republic, he had only commanded one corps or roughly 28,000 men. Napoleon would have to drastically expand that network in order to control up to ten times as many soldiers.

The next step in the problem solving process is the *project system.* This is where the engineer formulates his strategy for his design, develops, and produces a solution for the problem (Marvel, 2008). In systems engineering this is also referred to as methodology. Napoleon's Italian campaign of 1796 afforded him the opportunity to experiment with the effectiveness of his C2 system. He organized his one corps into a structure he would apply to his design of the Grand Armee (Rothenberg, 1999).

The final step in the process is referred to as the *delivered system.* This represents the finished product which included the testing and verification that the system meets the requirements set forth in the design concept (Marvel, 2008). For Napoleon, verification would come at the Battle of Ulm in October of 1805. The Austrians under General Mack would be the first nation to witness the lightning quick efficency with which Napoleon's organization operated.

Systems engineering also relies on an ability to utilize current technology and resources in order to meet the system goals. Napoleon Bonaparte applied the standard systems engineering process when he set out to reorganize the military corps formation. His goal for the corps system was to create an organization that could function autonomously. The corps was a self-contained army and C2 network, complete with all military elements and led by a marshal and staff corps. The result of this design impacted the command and control of the Grand Armee by improving the flow of information throughout his organization.

2.   Information Systems

Information is simply the influx of data that are relevant, timely, and concise (Tushman & Nadler, 1978). This information effects a change in knowledge. This change in knowledge is the result of information processing. Information processing is at the heart of an effective information systems network. Tushman and Nadler define information processing as the collection, interpreting, and synthesis of information in respect to organizational decision making (Tushman & Nadler, 1978).

Napoleon designed his organization so that he could serve as the nucleus of his command and control network. However, its effectiveness depended on the flow of information from his units in the field. This information flow was regulated by Marshal Berthier and the General Staff. Information was collected and organized by Berthier and then forwarded to Napoleon for processing and interpretation. This step is an integral process in an organizational information system. An organization must acquire, analyze, de-conflict, and internally disseminate information in order to carry out critical functions

of control and decision making (Huber, 1982). Chapter III will discuss in detail the design and layout of the General Staff and its role in Napoleon's organization and C2 structure.

The term network is defined as an interconnected or interrelated chain, group, or system (Network, 2009). This definition will be used in terms of command and control and the information systems that connected related groups within Napoleon's organizational design. The relationship between the General Staff and the staff corps of individual army corps represents a network created by Napoleon's organizational design. The General Staff was responsible for the flow of information within Napoleon's C2 structure. This network depended on a highly organized courier system that delivered information to all parts of the empire (Elting, 1988).

Military intelligence was a major component in Napoleon's information system. The need to gather intelligence has not changed through the evolution of warfare, only the means and technology used to gather it. Intelligence gathering for Napoleon's organization included troop movements, terrain scouting, force size, composition, intentions, and unit strength and weaknesses. Basic intelligence gathering was accomplished through a well arranged system of espionage, capturing prisoners, probing with cavalry scouts, and intercepting messengers (Jomini, 1862/2007). Intelligence gathering was supervised by an Intelligence Bureau that Napoleon established within his Imperial Headquarters. Unfortunately, many of these operations were only vaguely recorded (Elting, 1988).

Napoleon used his political station as Consul and Emperor as an extension of his information network. The majority of his intelligence came from his diplomatic service, every French ambassador had his own spy net and staff, who made friends with loosed-lipped government officials (Elting, 1988). Napoleon's diplomatic service also produced intelligence from foreign newspapers as well, finding them most informative.

In the end, Napoleon' organization and system of command and control depended heavily on a diverse information system. Napoleon drew his information from many

agencies, including the Intelligence Bureau and his system of diplomatic espionage. This information came by many means, and he often paid well for it (Elting, 1988).

C. ORGANIZATIONAL DESIGN

1. Organizational Design

Many of today's theories on organization have their origins in the organizational designs created in a military structure (Autry, 1996). Although this thesis will focus more on Napoleon's ability to restructure his military organization, he was also very successful in redistributing responsibilities within his government. In both facets, Napoleon is what Henry Mintzberg refers to as the *strategic apex*, or top management. Napoleon in essence did the hiring and firing of the people to do the basic work of the administration (Mintzberg, 1980). Napoleon made all decisions within his organization both militarily and domestically. From a military point of view, Napoleon acted as his own operations officer. Napoleon often remarked that he required no advice from his generals, for he alone knew what he must do (Rothenberg, 1978).

There are five basic organizational design clusters or configurations. These configurations are the *simple structure, machine bureaucracy, professional bureaucracy, divisional form,* and *adhocracy* (Mintzberg, 1980). Napoleon's organizational design falls primarily within the definitions of the *simple structure* and the *machine bureaucracy.*

The *simple structure* is the baseline for all of the organizational design structures. As its name suggests, there is not very much involved in this structure. It is defined as one large unit consisting of one or a few top managers and a group of operators who perform the basic work (Mintzberg, 1980). Looking at Napoleon's organization through a lens of organizational design reveals a simple structure. This structure is evident with Napoleon representing the apex. His top managers consisted of his General Staff, and then Napoleon's marshals and their respective staff corps. The simple structure functions most effectively in an environment where one man is making all decisions and requires minimum assistance to distribute and carry out orders. Napoleon as a supreme

commander often held an advantage over his Coalition adversaries who were often without a unity of command. This often allowed Napoleon to react more quickly to tactical situations while his enemies wasted time deciding amongst themselves what action to take. Chapter III will discuss what elements of Napoleon's design can be most represented by the simple structure configuration.

The *machine bureaucracy* is often associated with the industrial revolution and its standardization of work for coordination and its resulting low-skilled, highly specialized jobs (Mintzberg, 1980). The Napoleonic structure was very standardized from the very day to day schedule the man kept, to the manner in which Marshal Berthier ran the general staff. Standardization was the key in the development of the standing armies of the day. High attrition rates from Napoleon's campaigns meant that new recruits were constantly refilling the ranks (Elting, 1988). Standardization within the command structure, i.e. staff corps assigned to each corps allowed for the continued ebb and flow of daily operations within the unit, in addition to the supervision of drills and training for the new recruits (Elting, 1988). When viewing Napoleon's design from the modern lens of organizational design it must be noted that his simple structure contained the standardization element of the machine bureaucracy.

2. Principles of Organizational Design

The organizational process begins with the creation of a strategy or objective. The strategy is derived from clear, concise statements of purpose and vision from the organization's philosophy (Autry, 1996). The strategy should utilize the five basic principles of organizational design: *division of labor, unity of command, authority* and *responsibility, spans of control*, and *contingency factors*.

The *division of labor* covers the departmentalization of the men and women who work for the organization (Sharma, 1995). For Napoleon, this illustrates how he divided his various divisions to create his corps system. These new departments (corps) now required the second component of *division of labor*, specialization. Specialized workers were needed in order to operate in Napoleon's organization. A classic example would be the mobile artillery units created by Napoleon to bring field artillery pieces expeditiously

to points in the line for defence or to spearhead a charge in the enemy's line. This specific division of labor was paramount in the Napoleonic tactic of massing artillery to achieve maximum firepower (Clausewitz, 1812/1942). This required a new specialization requirement for a member of the cavalry as well as the artilleryman. New specialized troops meant new training requirements. Napoleon was able to train his troops on the proper allocation of this tactic during the two years he spent forming the Grand Armee in northern France (1803-1805) (Elting, 1988).

The *unity of command* principle establishes a chain of command. Napoleon designed his organization such that he maintained a role as an ultimate authority. Napoleon's contemporaries amongst his enemies often had to operate in an environment without unity of command. Napoleon never had to contend with his decisions affecting the national interests of his allies. Napoleon's allies were normally satellite states of his empire and therefore subject to his decisions (Howard, 1988). From a military perspective, the upper echelon chain of command consisted of the corps Field Marshals, then Napoleon's chief of staff (Marshal Berthier), and finally Napoleon. The success in the *unity of command* relied heavily on the strategic apex concept (Sharma, 1995).

The next principle is *authority and responsibility*. Napoleon was obviously the ultimate authority. However, Napoleon had to grant his Marshals command by negation in many instances due to proximity of their units. Although, it was the marshal's responsibility to report his movements to the General Staff, they had to exercise autonomous authority from time to time in order to achieve the goals set forth in Napoleon's orders.

Napoleon had developed a trust in the majority of his marshals through serving with many of them in his early campaigns in Italy and Egypt prior to the formation of the Grand Armee. Through the specialized training that occurred during the build-up of the Grand Armee, Napoleon's confidence in his commanders increased (Elting, 1988). They conducted drills that emphasized the Napoleonic way of war. Through strategic and tactical repetition Napoleon hoped to ensure his commanders would respond to a tactical

14

situation appropriately. Although ultimate responsibility lay with the Emperor, Napoleon never hesitated to hold one of his generals responsible for the failure to carry out his orders successfully.

Spans of control refer to the levels of authority delegated to the various management positions within Napoleon's organizational structure. For example, Napoleon would often grant his aides-de-camp authority to speak on his behalf (Elting, 1988). These aides-de-camp had the complete trust of their emperor through years of service and were hand selected. In some instances Napoleon even required them to go into the field to relieve a general of his command. This was the case at the Battle of Wagram in which Napoleon had Marshal Bernadotte relieved for abandoning the town of Aderklaa (Horward, 1988).

The last principle of organizational design is called the *contingency factors* (Sharma, 1995). The environment and weather are two contingency factors that armies are always faced with. One of the keys to Napoleon's success was the ability of his organization to adapt to its environment. Some elements of the Grand Armee had been with Napoleon since his Egyptian Campaign of 1798. Many had survived plague in Egypt and starvation during Napoleon's earlier campaigns in Italy. The resilience of the Grand Armee was always a source of confidence for Napoleon who was never afraid to push his men to their physical limits. In fact, much of the success of the Grand Armee was due to their ability to cover great distances in short periods of time (Bruce et al., 2008).

This chapter has served as an avenue to highlight key terms and concepts in regards to the command and control of the Grand Armee as they relate to organizational design. The components of Napoleon's information network were engineered to capitalize on improvements made in France's infrastructure.

Napoleon utilized concepts of modern organizational design and systems engineering centuries before they became areas of academia. These modern concepts help to gain understanding of how Napoleon restructured the Grand Armee. During this process he also created a highly effective command and control network. The schematic

15

he created became fashionably popular and his organizational model has been analyzed and applied through the generations. Chapter III will analyze how modern methods of organizational design and systems engineering were applied by Napoleon to create his information system.

III. STRUCTURAL MODEL OF NAPOLEON'S ORGANIZATIONAL DESIGN

A. EVOLUTION OF THE CORPS FORMATION

The corps formation became the cornerstone of Napoleon's Grand Armee and a major component of his organizational design. The corps consists of two or more infantry divisions, a brigade or division of light cavalry, artillery batteries, and a detachment of engineers and support troops (Rothenberg, 1978). The corps organization was originally adopted by France's National Assembly in 1794. The system had been experimentally used by one of Napoleon's chief rivals, General Jean Victor Marie Moreau, who initially helped Napoleon to power, but was later exiled to America (Elting, 1988). By 1800, Napoleon began the design process that would restructure his military divisions into army corps (corps d' armee).

1. Design Process

The organizational design process begins with the creation of a strategy. For Napoleon, that strategy was to create a standing army that was swift and versatile. This army would consist of numerous self-contained army corps. These units had to have the capability to maneuver effectively when detached from the centralized command of Napoleon. However, the centralized command required the need to maintain an effective command and control network in order to redirect forces when Napoleon deemed it necessary. The birth of the Grand Armee can be set in May, 1803, when England repudiated the Treaty of Amiens and declared war on France (Elting, 1988). Napoleon responded by concentrating large forces, designated as the Army of England, in camps along the English Channel and the North Sea.

The strategy in the design process must be derived from clear, concise statements of purpose and vision. The strategy helps to unify the intent of the organization and focuses soldiers toward actions designed to accomplish desired outcomes (Autry, 1996). These armies had become battle hardened through campaigns in Italy along with those

who returned with Napoleon from the Egyptian campaign. In order to provide his organization with a purpose and vision, Napoleon sought to instill pride in his troops, love for the Republic, and share in his vision to rid Europe of the established monarchies (Esdaile, 2007). The monarchies of Europe who constantly tried to undermind Napoleon's rule and return the House of Bourbon to the throne of France (Esdaile, 2007).

While waiting to invade England the troops stationed in northern France received intensive training on new tactics and equipment. Napoleon's men were trained in the maneuvering strategy of the army corps. Here Napoleon's soldiers learned how to march divided and fight united, which would become another Napoleonic way of war (Bruce et al., 2008).

For nearly three years the army drilled and maneuvered giving the command element a chance to become more proficient with the newly organized corps. Many of the new tactics were small unit maneuvers. This gave Napoleon's organization a chance to become more proficient in C2. These tactics developed from Napoleon's new corps design, and had been tested on a smaller scale in Italy and Egypt (Bruce et al., 2008).

Eventually, a shortage of adequate sea transportation and artillery would deter Napoleon from an invasion of England. From 1805, the Army of England became known as the Grand Armee (Horward, 1988).

The manifestation of the Grand Armee had been Napoleon's visionary design for a military organization. He had already achieved absolute political power in France. As an absolute autocrat, there would not be any other competing authority in France with the Grand Armee under his command (Rothenberg, 1978).

2.   Corps Design

Napoleon institutionalized the corps organization for strategic and tactical purposes. The object was to engineer a smaller more maneuverable force which contained all facets of an organized army. The reorganization of the corps became the foundation with which Napoleon set himself apart from his contemporaries. From Napoleon's perspective, command and control issues were accomplished by maintaining

an effective messaging system (Elting, 1988). His messaging system consisted of an elaborate courier system that included lock boxes and a travel log to track the movements of the couriers. Napoleon insured that his generals were well informed of his intentions. By accomplishing this, Napoleon's army had a heightened state of situational awareness.

Good situational awareness increased the effectiveness of his organization by allowing his field commanders to decide how to best prepare for an upcoming engagement. In contrast, most of the conscripted armies of Europe travelled in mass which eased the burden of command and control (Clausewitz, 1812/1942). Many Coalition commanders were not as forthcoming with information to their subordinates, thus limiting their situational awarness and commander's intent.

A typical corps in the Grand Armee consisted of around 28,000 infantry, 1,400 cavalry, plus its artillerymen, engineering corps, and staff corps (Elting, 1988). Napoleon engineered this organization to move autonomously and be able to meet and defeat an enemy of equal strength. He deployed his corps so that no one corps was further than a one day march from another. This concept was built around the premise that one of his corps could engage a superior enemy force and hold them at bay until reinforcements had arrived (Clausewitz, 1812/1942). Napoleon depended on well developed lines of communication to pass news along whenever one of his corps engaged the enemy. Napoleon often enlisted allied forces to garrison cities and towns that he conquered in order to protect his lines of communication (Horward, 1988). By creating a standardized organization whereby each corps was roughly interchangeable and able to exchange roles, Napoleon enhanced his strategic level of performance. Instead of being an army in mass, the Grand Armee was able to spread its corps a distance of fifteen to thirty miles from each other to avoid traffic control and supply problems (Van Creveld, 1985). Whenever the road permitted it, the corps would march in three or four columns to allow more rapid maneuver and deployment able to seek out, accept, or avoid combat as its commander chose (Elting, 1988).

Napoleon's corps design follows the first principle in organizational design, *division of labor* (Sharma, 1995). The Grand Armee was departmentalized into each individual army corps, each with its own staff and Field Marshal. Napoleon required a

specialized labor force within his organization to lead his army corps. During the build up to invade England, Napoleon had the opportunity to remove any undesriables in his officer corps which he felt were not capable leaders (Elting, 1988). The French Revolution had removed any prerequisite of noble blood or station to become a member of the officer corps. Napoleon wasted little time in promoting deserving leaders to direct his units, as all his future marshals shared one quality, conspicuous bravery (Rothenberg, 1978).

These specialized leaders were responsible for training their individual corps to maneuver and fight in the corps formation. The corps organization consisted of many other skilled laborers, including the vaunted mobile artillery units. Napoleon utilized specialized cavalry units to haul light weight cannons around during an engagement. These units were paramount in his overall organizational strategy as the could deliver needed artillery support to spearhead an advance, or be relocated to break up an impending cavalry charge into the flank (Jomini, 1862/2007). These units required a laborer who was specialized in artillery as well as horsemanship. One unique quality of Napoleon's corps was that they were theoretically interchangeable, therefore one artillery brigade from one corps could be reassigned to another without missing a beat. This fact illustrates the importance of specialization and standardization within the workforce of Napoleon's *machine bureaucracy*. These interchangeable parts helped to prevent a breakdown in Napoleon's organizational design.

3. Corps Command and Control Element

The command and control of the corps formation was a crucial element in Napoleon's organizational design. In terms of organizational design, the C2 network consisted of a *unity of command* which established Napoleon as its apex (Sharma, 1995). As the apex, Napoleon followed the concept of *one superior* with no peers to question his decisions. This concept meant that decisions could be made quickly and without conflict (Van Creveld, 1985).

A *line of command* was established that allowed the flow of information from Napoleon through his chief of staff, Marshal Berthier, to Berthier's adjutants, then to the individual corps staff, and finally the corps' marshal. The corps commander was responsible for sending and receiving information from his brigade commanders. In order for this to be a successful information network, the flow of information had to be maintained in both directions. When this portion of Napoleon's organization remained intact, victory was usually the outcome of the engagement.

As head of state and supreme military commander, Napoleon had distinct advantages in maintaining control of planning and operations. It is important to note that his command and control system never changed even as his command grew from 50,000 men to 400,000 (Rothenberg, 1978).

Napoleon laid the foundation for modern organizational design concepts in order to create an effective C2 element for his corps formation. This C2 element was highly dependent on the organizational and leadership skills of the members of the staff, and General Staff corps.

B.   IMPERIAL HEADQUARTERS ORGANIZATION

Although Napoleon was the apex in his organization, he relied heavily on those around him for the flow of information. If Napoleon is the brains of the organization, then the imperial headquarters would be its central nervous system. Napoleon the organizational designer was the architect of an imperial headquarters designed to fit the *simple structure,* with elements of a *machine bureaucracy;* he had created (Mintzberg, 1980).

Napoleon divided his headquarters up into three parts: the Emperor's Maison, the General Staff, and the Administration headquarters (Van Creveld, 1985). Each of these independent tiers reported directly to Napoleon and were each vital to the success of his organization. However, the Maison and the General Staff offer the best examples of Napoleon's talents as an organizational designer.

1.   Maison

The meaning of the term Maison was a lingering word from the Middle Ages that meant "household" (Elting, 1988). As the name indicates, it was basically the part of the king's household that accompanied him on campaign. It was revived by Napoleon while he was Consul. In 1806, it consisted of around 800 grooms, valets, pages, cooks, and personal bodyguards (Van Creveld, 1985). The Maison was also comprised of his personal staff and aides-de-camp. The imperial aides-de-camp were hand-picked soldiers who were capable commanders that could lead any force of arms. The aides-de-camp were an intricate part of Napoleon's information system. They were authorized to speak in the Emperor's name and were often detached from the Grand Armee on particular important missions of state (Elting, 1988).

Napoleon entrusted two men with the responsibility of the Maison. General Geraud Duroc was overall in charge and handled many diplomatic missions for Napoleon. General Armand Caulaincourt was responsible for the Emperor's travelling arrangements. His duties also included accompanying Napoleon on reconnaissance and during battles to dictate any orders that Napoleon would issue (Van Creveld, 1985).

Within the Maison was the Emperor's cabinet, which had three main divisions, Intelligence, Topographical Bureau, and the Secretariat. Two of these cabinet positions were paramount to Napoleon's information system, Intelligence, and the Secretariat.

The Intelligence cabinet gathered and collected information from its espionage network of spies and agents of French ambassadores. They were also responsible for translating foreign newspapers as well as monitioring the situation in Paris while the Emperor was away (Elting, 1988).

The Secretariat consisted of shorthand secretaries, librarians, and archivists, whose responsibility it was to dictate for the Emperor. This included another key element of the information system, the state newspaper. Napoleon would dictate to his secretaries exactly what he wanted published in the Paris newspaper. Sometimes this

included reporting favorable causalty numbers from a victory (Elting, 1988). This serving again as emphasis that Napoleon had engineered his organization with himself as its apex.

2. General Staff

Once Napoleon organized the Grand Armee into a highly versatile organization, he then centralized his control through his General Staff, and its chief, Marshal Berthier. Berthier directed a general staff which included a large number of knowledgeable officers who provided all manner of information requested by Napoleon. Berthier's aides provided information on types of roads, layouts of towns, and the quality of equipment carried by enemy units (Horward, 1988).

In 1796, while serving in the Army of the Alps, Berthier had created a document that highlighted his duties as chief of staff. Berthier would divide the responsibilites of the General Staff into four sections, and assign an adjutant general to each section (Van Creveld, 1985). The chief of staff's duties consisted of maintaining situation reports, dispatching orders, mainatining an army's war diary, maintaining maps, keeping registers, and conducting inspections. Berthier also emphasized that all correspondance that leaves the staff office must come from the chief of staff as he is the central point for all operations (Elting, 1988). In the absence of the chief of staff he would issue special orders authorizing one of the adjutant generals to send out orders on his behalf (Van Creveld, 1985).

This staff organization was standardized throughout the Grand Armee. The same functions applied to the staff officers at the corps level as they provided for their individual marshal. A highly successful example of this relationship developed between Marshal Ney and his chief of staff, Antoine-Henri Jomini (Rothenberg, 1978). This standardization provided symmetry to Napoleon's organization and C2 network.

Eventhough Napoleon built his staff corps from an excellent pool of trusted officers, he remained his own operations officer and continued to make all decisions. Marshal Berthier did not participate in the planning process of the Emperor. In 1806, Napoleon had instructed Berthier to "adhere strictly to my commands. I alone know

what I have to do" (Rothenberg, 1978). Berthier proved to be a quick learner has he in turn told Marshal Ney in 1807, "the emperor needs neither advice nor plans of campaign. No one knows his thoughts and our duty is to obey" (Rothenberg, 1978).

There was not a written standard operating procedure for Napoleon's headquarters, just customs that had long been engrained into the General Staff (Elting, 1988). Berthier had developed a correspondance system within Napoleon's command organization. All military correspondance went through Berthier, even instances where aides-de-camp or marshals were to report directly to Napoleon, they had to provide Berthier with his copy of the correspondance (Elting, 1988). Berthier often encoded and decoded messages for the Emperor, either sent or received via telegraph, or by courier. Orders were sent out as multiple copies each one proof read by Berthier before they were sent to Napoleon for release authority. One copy of the order was also filed away in the headquarters archive.

Orders were normally sent via multiple couriers taking different routes in case one was intercepted. Courier's were required to receive a reciept from the corps staff once they delivered the correspondance, this provided a means to ensure Napoleon's orders were delivered (Van Creveld, 1985). In terms of information processing, this was the movement of information in a timely fashion, and transmission without distortion (Tushman & Nadler, 1978).

Marshal Berthier and the General Staff had to keep up with Napoleon's schedule, sometimes the Emperor would not sleep on the eve an engagement. However, most nights he went to bed around 7:00 pm and would wake up around midnight or 1:00 am (Elting, 1988). This was usually the time reports would start to arrive and had been processed by the General Staff. This gave Napoleon the time to study his reports and maps and issue the days marching orders. Berthier would check them again after they were signed by Napoleon and then they were dispatched, normally around 3:00 am (Elting, 1988).

The General Staff served as a data hub for the information system within Napoleon's organizational design. Although Napoleon made all decisions he clearly could not have managed his organization on his own. Marshal Berthier was masterful in his organization and attention to detail. This attention to detail greatly increased the effectiveness of the entire staff corps of the Grand Armee and ultimately the entire organization.

The structural model of the Napoleonic organizational design depended on Napoleon's restructuring of the military corps formation. The corps formation became the military backbone of the Grand Armee. The extent of Napoleon's information network is evident in the command and control system of the corps. This chapter also explored the inside of Napoleon's Imperial Headquarters, and how it served as the key structure in controlling the manpower within the organization created by Napoleon. Chapter IV will provide historical military accounts of the effectiveness of Napoleon's command and control system as a result of his organizational design.

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IV.   ANALYSIS OF NAPOLEON'S ORGANIZATIONAL DESIGN IN KEY BATTLES

The Grand Armee had spent two years training in northern France for an invasion of England (Elting, 1988). During these two years Napoleon and his General Staff were able to exercise the C2 network within the organization that Napoleon designed. Small unit tactics were emphasized at the corps level. Individual Marshals drilled and maneuvered the divisions and brigades within their corps (Elting, 1988).

In 1805, British Prime Minister William Pitt successfully persuaded Austria and Russia to join the British in the Third Coalition (Horward, 1988). Napoleon's Grand Armee swept across France and into Germany to confront Austria before her coalition partners could join her against France. Napoleon now had the opportunity to showcase his organization The success of the Grand Armee would depend on how well this organizational design functioned in war.

A.   THE MANEUVER ON ULM: 20 OCTOBER 1805

One of Napoleon's greatest victories was not actually a battle of epic proportions but a strategic maneuver that would become a hallmark of the Napoleonic way of war. The maneuver emphasizes the agility of Napoleon's C2 network and the extraordinary speed at which his organization could function.

In response to the Austrian invasion of Bavaria on September 9th, Bonaparte sent out his marching orders to seven corps of the Grand Armee (Howard, 1988). The corps were detached and moved along parallel roads across France. Five of the seven corps, or about 120,000 men, marched from Pas-de-Calais and Holland to the German frontier in 30 days, a distance of some 500 miles (Bruce et al., 2008). This feat optimized the well developed infrastructure within France. Napoleon utilized the roads to spread out and expand his command and control network.

Speed was usually the key to Napoleon's success, as he was almost always outnumbered by the coalitions formed against him (Clausewitz, 1812/1942). His move against the Third Coalition exemplifies this point. Napoleon had to react quickly to dispatch General Karl Mack's Austrian forces before he was reinforced by Archduke Charles who had a larger Austrian force headed toward Northern Italy (Rothenberg, 1978). A large Russian army was also on the move and headed toward Bavaria which would have given the Third Coalition a definite numerical superiority.

The Grand Armee was assisted by the many princes in Bavaria who provided food and fodder for Napoleon's troops (Bruce et al., 2008). This alliance with the Bavarian princes was a product of Napoleon the statesman, who added these resources to the collective organization of the Grand Armee.

In the space of four weeks, a series of well coordinated, tough marches had surrounded General Mack and his 50,000 Austrians in the city of Ulm. Napoleon utilized his cavalry forces under Marshal Murat to provide a screen near the Black Forest, which was traditionally the French invasion point into the region (Rothenberg, 1999). This screen provided a stream of bad data that was received by Mack as he deployed his defenses in support of this area. Napoleon took advantage of the exploitation of his enemy's information network. While Murat feigned in the south, the Grand Armee crossed the Rhine to the north and completed a strategic envelopment of Ulm (Horward, 1988). This maneuver had isolated Mack from the remaining Austrian forces as well as the Russian army some 180 km away from Ulm. On 20 October 1805, General Mack was forced to surrender to the French.

This example highlights the effectiveness and agility of the command and control structure that Napoleon's organizational design provided. This maneuver features a Napoleonic philosophy to march divided and fight united. Napoleon's soldiers noted that, "the Emperor makes war not with our arms but with our legs" (Rothenberg, 1999).

B.   BATTLE OF AUSTERLITZ: 2 DECEMBER 1805

The battle of Austerlitz is considered by many to have been Napoleon's most decisive and dramatic victory. The first field test of Napoleon's organizational design

had been a success at Ulm. His information network provided him with intelligence that his Grand Armee was still numerically inferior to the combined forces of the Third Coalition. Napoleon knew he had to achieve another decisive victory while the coalition was divided (Horward, 1988).

After his precision maneuver to defeat General Mack at Ulm, Napoleon sent his army across southern Bavaria and into Austria (Horward, 1988). His intelligence network provided him with vital information on enemy positions. Napoleon learned that Russian general Mikhail Kutusov's advance force of 36,000 had joined an Austrian force of 20,000 men. The Russian Tsar, Alexander I was close with another 30,000 Russian troops and still making his way from northern Italy was Austria's Archduke Charles with a force of 90,000 (Rothenberg, 1978). Further threatening the French advance, the Prussians had decided to join the Coalition and were on the move from Bohemia (Bruce et al., 2008). Again, Napoleon was faced with the situation of fighting against a numerically superior force.

The Grand Armee had been spread thin as it moved across Bavaria, having to occupy Ulm and the Austrian capital of Vienna. Vienna had been captured by Marshal Murat and his cavalry on 12 November (Horward, 1988). The nature of Napoleon's system required that the corps travel separately in order to effectively forage for food. Utilizing his intelligence resources, Napoleon calculated the time distance for Archduke Charles and his forces to arrive on the scene (Rothenberg, 1978). Napoleon had to either retreat back to Ulm or achieve a decisive victory once again by attacking his enemies separately.

Napoleon had fewer than 55,000 men concentrated for battle at the time he set his plan in motion. The emperor's information network within his organizational design provided him with the means to effectively dispatch riders. They were to inform Marshals Davout and Bernadotte that they were to engage their corps on a forced march to support Napoleon at Austerlitz by 2 December (Bruce et al., 2008). The arrival of Davout and Bernadotte would increase Napoleon's forces to at least 70,000. The emperor would still have to contend with a numerically superior force of 89,000 Russians and Austrians.

Napoleon's strategy involved creating an illusion that his army was inferior in numbers, equipment, and supplies (Horward, 1988). Napoleon wanted to entice the Russian and Austrian force now led by Alexander to attack before the rest of the allied contingent arrived. Napoleon had even sent one of his aide-de-camps to negotiate an armistice to further advertise French weakness and need for time to consolidate (Horward, 1988). This move further emboldened Alexander who ordered the advance from Olmutz toward the French camps around Austerlitz. Alexander ignored the advice from General Kutusov that they should wait for the arrival of Archduke Charles (Bruce et al., 2008).

As the coalition forces advanced on Austerlitz, Napoleon ordered the withdrawal of Marshal Soult's corps from the strategically important Pratzen Heights. Napoleon's move to give up the high ground was against all conventional military wisdom (Jomini, 1862/2007). However, this move also helped to support the illusion that his forces were too weak to defend an assault. In fact, Napoleon only maintained a force of around 10,000 men below the Heights, which became his right flank (Bruce et al., 2008). As expected the Russians and Austrians occupied the Pratzen Heights and made preparations to attack Napoleon's weak right flank. The allies had now unknowingly adopted the exact plan that Napoleon had encouraged with the deployment of his forces (Horward, 1988).

The effective command and control of the Grand Armee that resulted from Napoleon's organizational designing prowess was again on display. The forced march order had brought Davout up from Vienna. He was now moving close enough to too support Soult on the morning of 2 December, when the Russian would begin their assault from Pratzen Heights (see Figure 1). Marshal Bernadotte's movement orders put him in a position to reinforce the left flank where Napoleon was planning his offensive.

On the eve of battle, Napoleon's information network included local peasants who reported to the emperor on the terrain and enemy troop deployments. Napoleon rode along his positions amidst a torchlight procession amid cheers from his men as he praised them for their skills as soldiers and strength as men (Horward, 1988).
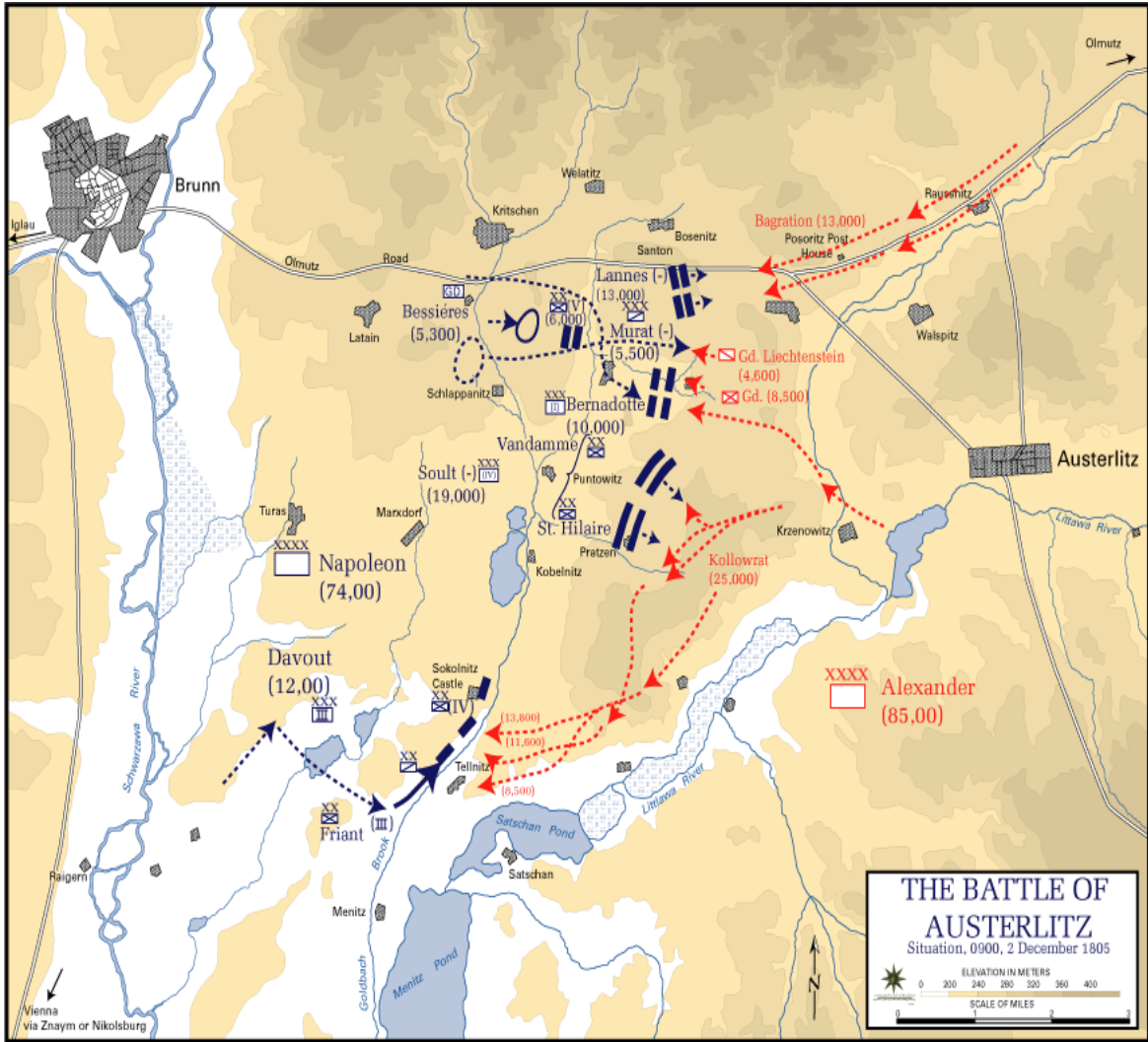
Figure 1.   Battle of Austerlitz (Battle of Austerlitz, 2009)

As forecasted, the Russians troops advanced on Napoleon's perceived right flank. To further conceal the ruse, a morning fog had helped conceal Davout's approaching force (Rothenberg, 1978). As the Russians attacked they were increasingly slowed by Davout's advancing force. The Austrian forces on the Pratzen Heights moved down to enforce the Russian advance. The trap had been sprung. Napoleon unleashed his attack from the left flank that contained the bulk of his army (Bruce et al., 2008). Napoleon advanced up the now lightly defended Pratzen Heights and swept in behind the bulk of the Russian forces that had been attacking his right flank. This double envelopment

maneuver crushed his enemies. By 3:00 pm, 15,000 Russian and Austrian soldiers lay dead on the field of Austerlitz, and another 12,000 had been taken prisoner (Horward, 1988).

Through proper application of Napoleon's organizational design coupled with his understanding of his enemies C2 network, Napoleon orchestrated a series of maneuvers that exploited his enemy's errors. As the apex of his organization, his personal supervison assured exact timing for his counter attack orders that were distributed through his command and control network.

Napoleon was similar to Frederick the Great in that both were the military and political leader of their state. In effect, Napoleon's personal decisions translated into a dedication of the state to achieve the ends by whatever means he deemed necessary. As was often the case, the Allied Coalitions that fought against Napoleon often had differnet political agendas (Van Creveld, 1985). The Russians and Austrians did not posess the unity of command that Napoleon enjoyed. Agreements had to be made amongst the coalition in order to act, often wasting precious time that was exploited by Napoleon and ultimately led to his magnificent victory at Austerlitz (Horward, 1988).

C.   THE BATTLE OF WAGRAM: 5-6 JULY 1809

Wagram was the largest European battle in terms of numbers to date (Bruce et al., 2008). The Grand Armee was fighting against the Austrians once again as part of the Fifth Coalition formed against Napoleon. Archduke Charles finally had faced Napoleon on the battlefield and handed the emperor a defeat in May of 1809 at the battles of Aspern-Essling. The Archduke famously defended his side of the Danube River while Napoleon attempted to cross to the south. One corps of Napoleon's troops had been isolated as Austrian troops sent barges down the Danube that destroyed bridges as Napoleon's men crossed (Horward, 1988). Napoleon was forced to withdraw to his side of the Danube. Not too be discouraged by this set back, Napoleon tapped the resources of his information system once again. Inside the imperial headquarters Napoleon set his staff to work preparing marching orders for French corps spread across Europe to concentrate around Vienna (Horward, 1988).
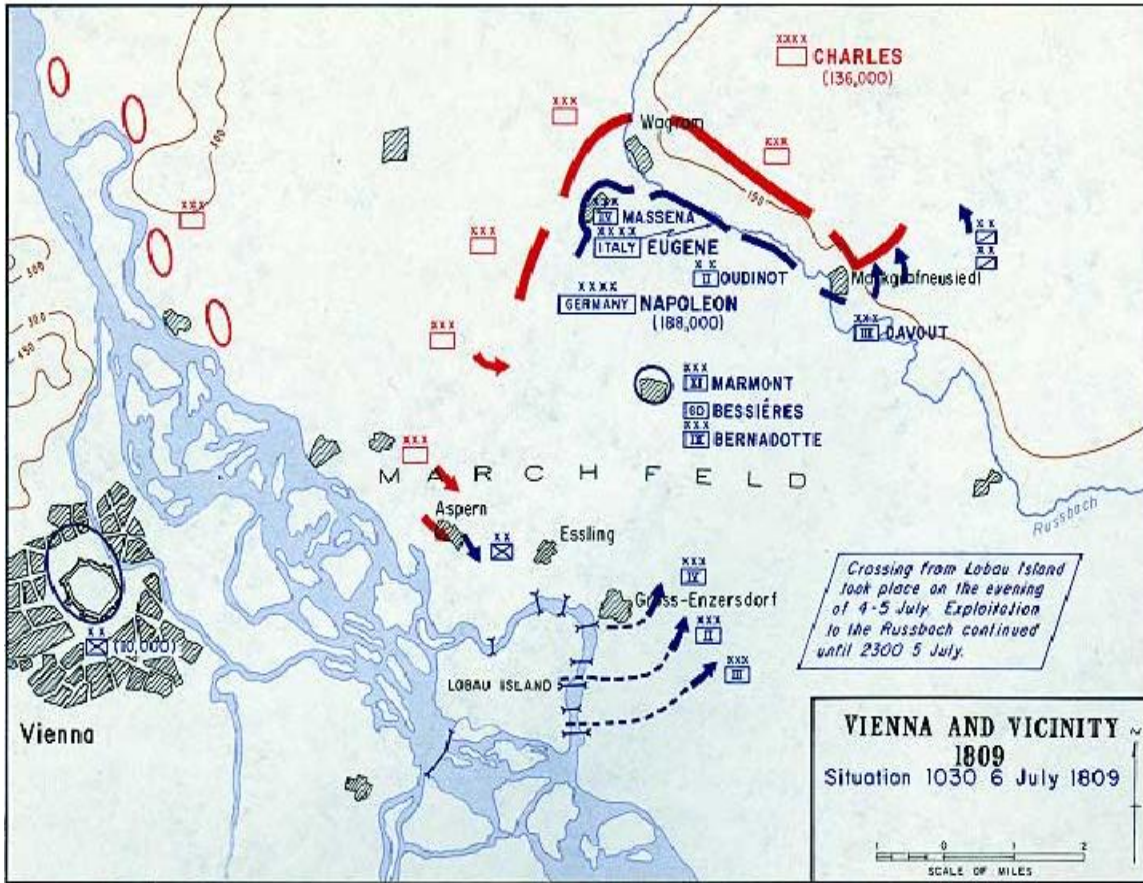
Figure 2.   Battle of Wagram (Battle of Wagram, 2009)

Troops were on the move from as far away as Italy, Spain, and Dalmatia. Napoleon even employed German auxiliaries to guard his lines of communication back to France (Bruce et al., 2008). Napoleon had learned from his defeat at Aspern-Essling. He meticulously began to formulate a plan that would supply enough bridges to cross the Danube more expeditiously. Within Napoleon's General Staff, the staff corps of engineers began to construct three permanent bridges across the Danube. His engineers then prepared 12 pontoon bridges (Bruce et al., 2008).

By July, elements of the Grand Armee increased from 60,000 to 160,000 in the vicinity of Vienna (Horward, 1988). Napoleon had successfully optimized his C2 network throughout the empire to gather a sufficient force to attack Archduke Charles once again.

Napoleon as the apex of his organization began to inform his marshals of his plan to traverse the river. This time he had planned for every contingency as he established several diversionary points of attack. The battle occurred over a 10 mile area and illustrated once again the agility and efficiency of Napoleon's Grand Armee. The battle serves as an excellent example of the command and control of the Grand Armee. Napoleon coordinated through his marshals the redeployment of three corps comprised of 72,000 infantry, 9200 cavalry and 280 cannon across the Danube River in just twelve hours. The unopposed crossing of the Danube came courtesy of the diversionary attack on the Austrian force across the river further to the north (Bruce et al., 2008). A tactical maneuver made possible by successful execution within Napoleon's C2 structure.

Archduke Charles was woken at 4 a.m. on 5 July to find the bulk of Napoleon's army beginning the battle of Wagram (Horward, 1988). During the battle, Napoleon's information network proved far superior to that of his enemy. He coordinated counter attacks against his left flank, even marching Marshal Massena's corps parallel to the enemy line. This dangerous move had quickly reinforced his left flank and preserved Napoleon's victory (Horward, 1988). However, this maneuver left a hole in the French lines that was exploited by the Austrians. As they began to attack this hole, Napoleon coordinated a devastating massed artillery barrage of 112 cannon (Horward, 1988). The massing of artillery to achieve maximum firepower was yet another important Napoleonic way of war (Clausewitz, 1812/1942).

This victory for Napoleon forced Archduke Charles to sign an armistice, culminating in the Treaty of Schonbrunn in October 1809 (Horward, 1988). The results of Wagram reflected on Napoleon's ability to maintain an efficient C2 system during the course of an engagement. Archduke Charles was an effective general having been the first commander to defeat Napoleon in ground combat. However, his command and control was ineffective as the Archduke rarely made his intentions known to his subordinates at the outset of an engagement (Bruce et al., 2008). In contrast, Napoleon made all decisions in the course of a campaign but always made sure that his subordinates were well informed of his intentions.

These three battles explored the successes achieved through the versatility of Napoleon's organizational design. First, the Grand Armee's ability to march divided and fight united could only have been achieved with a highly effective command and control network. Napoleon achieved many of his victories through well orchestrated strategic deployment of his corps. In contrast, his adversaries often travelled as a much larger force which made them more cumbersome and easier to track.

The key to Napoleon's victories became Napoleon himself, as he was the apex and mastermind of his information network. As the Duke of Wellington famously remarked that, "Napoleon's hat on the battlefield was worth 40,000 men" (Rothenberg, 1999). Napoleon maintained his status as the ultimate authority on all decisions made within his empire. However, he was able to decentralize his command by exercising command by negation with his Marshals and the General Staff. Napoleon kept his commanders well informed of his intentions through an effective messaging system. This allowed his Marshals a certain level of autonomy when proceeding on the duties assigned by Napoleon. The Battles of Austerlitz and Wagram have shown that his opponents seldomly shared their strategic or tactical plans with their subordinates.

The success of Napoleon's command and control and the fighting competency of the Grand Armee was often directly related to the proximity of Napoleon. The next chapter will consider possible further research For example, how did Napoleon's organizational design and C2 system fair when the emperor was not the on scene commander? In addition, what conclusions were drawn from analyzing Napoleon's command and control of the Grand Armee through a modern perspective of organizational design.

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V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The primary objective of this thesis was to investigate Napoleon Bonaparte's command and control of the Grand Armee through the lens of organizational design. Napoleon's methodology behind the design of the Grand Armee has been analyzed using modern principles of organizational design. The structure that Napoleon created was a vast information network that served as the framework for a highly effective command and control system. Napoleon dominated the war within the information domain leaving his enemies guessing about his next move. The Grand Armee transited the European countryside with lightning speed as Napoleon out maneuvered his enemies time and time again. Napoleon's dominance was a direct result of his organizational masterpiece that was the Grand Armee. From an organizational design perspective, Napoleon's methodology applied the ideas of others and exploited existing technology to affect his design.

The reorganization of the military corps became one of the most important transformations made by Napoleon. Using an innovative organizational design, his strategy combined divisions of infantry, artillery, and cavalry. This created smaller, self-contained armies within the greater Grand Armee. The army corps was considered a key component in Napoleon's strategic deployments. Napoleon had created a military philosophy of march divided and fight united. This strategy masked his intentions to his enemies as well as eased the strain of logistics.

Analyzing Napoleon's design from a modern perspective of organizational theory creates an opportunity to illustrate key principles of organizational design. First, Napoleon created a unity of command within his information network. The upper echelon of his command structure consisted of each corps individual marshal, Marshal Berthier, and finally Napoleon. Napoleon was the final authority on all decisions. Second, the army corps' functionality required a specialized workforce. This

37

organizational principle is called division of labor. Napoleon used his early build up for the invasion of England to develop and train his workforce in Northern France.

Napoleon's design for the corps included his command and control element. It contained a staff corps to function similar to the General Staff, scaled to the level of command. The staff network was paramount to the success of Napoleon's information system. With the help of his Chief of Staff, Marshal Berthier, Napoleon enforced standardization throughout his command network. This standardization included a highly effective messaging system that allowed Napoleon to operate as the apex of his organization. Although Napoleon was the apex, he was able to decentralize many of his command functions by creating a staff capable of handling the information traffic. The information flow was controlled by Berthier. Information flowed through a system of couriers and utilized developing technology such as Chappe's semaphore telegraph.

The information system that was part of Napoleon's organizational design also depended on non-military organizations as well. The creation of Imperial Headquarters allowed Napoleon to delegate matters of state as well as military engagements.

The Intelligence Bureau gathered and collected information from its espionage network of spies and agents working for French ambassadors throughout Europe. They were also responsible for translating foreign newspapers as well as monitoring the political intrigue within Paris. A successful intelligence network is paramount in determining an army's ability to wage war (Jomini, 1862/2007). Napoleon's C2 network relied heavily on intelligence concerning enemy force concentrations and movements. Strategic deployment and destination of the Grand Armee depended on the target Napoleon selected from this intelligence.

Three historical battles were presented as evidence to the effectiveness of Napoleon's organizational design. These battles emphasize Napoleon's ability to outmaneuver his enemies through command and control. Napoleon created a decentralized command structure that allowed him to maintain overall control of the Grand Armee. This structure delegated command to his corps commanders who operated

autonomously to carry out Napoleon's operational orders. The level of knowledge that the Marshals maintained of Napoleon's strategic plan helped facilitate Napoleon's C2 by decreasing the burden of information flow.

The maneuver on Ulm demonstrated the speed and efficiency with which Napoleon's command and control structure operated. By exercising his philosophy to march divided and fight united, Napoleon executed a double envelopment around the city of Ulm. This envelopment trapped the Austrian forces under General Mack forcing his surrender without any major military engagement. This move was made possible through utilization of many facets of Napoleon's information network within his organization. Napoleon relied on his spy network to report Austrian troop movements. He utilized his cavalry units under Marshal Murat to screen his troop movements. Napoleon's diplomatic efforts created an alliance among the Bavarian princes which kept open his lines of communication back to France.

At Austerlitz, Napoleon was outnumbered and forced to attack his enemies while their forces were divided. By dividing his forces, Napoleon created the image that he was weak and vulnerable to attack. Tsar Alexander I of Russia against the advice of his general advanced on Napoleon's position at Austerlitz. The advantages created from Napoleon's ruse were demonstrated through the effectiveness of Napoleon's command and control. Napoleon was able to dispatch orders to his corps commanders in a timely fashion. This allowed them to arrive in force exactly where Napoleon needed them once the engagement had ensued. This was arguably Napoleon's greatest military masterpiece.

The restructuring of the corps within the Grand Armee was instrumental in the ability of Napoleon to wage war. The battles at Ulm and Austerlitz demonstrate the ease with which Napoleon could navigate his corps around the battlefield as well as the information domain. The situational awareness created within Napoleon's organization greatly reduced the strain on his command and control element. In contrast, Archduke Charles maintained a more centralized command structure. He was constantly repositioning his units on the battlefield because he had a habit of not informing his

subordinate commanders of his intentions. This created a much greater strain on his C2 element and increased the amount of time he needed to respond to tactical maneuvers against his positions.

Napoleon Bonaparte engineered a highly effective, well organized, and extremely motivated fighting force. The success of the Grand Armee depended on the efficiency of the C2 network that Napoleon's organizational design provided. Analysis of Napoleon's command and control of the Grand Armee through the lens of organizational design revealed many things. Napoleon had an understanding of concepts in organizational design that would not be realized until they became areas of study in the twentieth century. By restructuring the corps de armee, Napoleon was able to create smaller self-contained armies within the collective of the Grand Armee.

Napoleon understood that dividing his forces when deploying for war would require an effective C2 network to bring them all back together again at the appropriate time. Therefore, his command and control network within each corps consisted of a Marshal and his staff corps. The staff corps was designed to operate as a smaller scale model of Napoleon's General Staff. The General Staff under Marshal Berthier acted as Napoleon's central hub for information flow within his organization.

Napoleon as organizational designer placed himself at the center of his organization and C2 network. He was the central processor or brains of the organization and all decisions were made by Napoleon. It was Napoleon in the end who managed the day to day operations of the Grand Armee, and the reason continuity and standardization was maintained throughout his organization. It was the organizational design of the Grand Armee that facilitated a C2 network capable of dominating France's enemies.

B.   FUTURE WORK

In deed much of the success of the Grand Armee was dependent on Napoleon's ability to manage his vast organization that continued to grow in the years after 1809. Many scholars and historians argue that the sheer size of the Grand Armee became too much for one man to control resulting in Napoleon's failures at Leipzig, Moscow, and

finally at Waterloo (Van Creveld, 1985). Although countless work has been written on Napoleon, there is still a myriad of questions waiting to be researched.

Napoleon created a successful organizational design for the land components of the Grand Armee. He was never able to establish control of the sea. His victory at Ulm was immediately followed up by the defeat of his fleet at the Battle of Trafalgar by Lord Nelson and the British fleet. His inability to gain a foothold at sea kept him from invading England. How did his lack of sea power affect the organizational design of the Grand Armee?

The Grand Armee was a highly effective fighting force that Napoleon guided through many engagements. The corps system he created was designed to act autonomously once given a desired set of plans or instructions from Napoleon. The success rate of Napoleon's armies without his presence in theater was dismal at best. The peninsula campaign against Spain in 1808-1809 was highlighted by a massive counterinsurgency from the Spanish population. How did this counterinsurgency manage to disrupt Napoleon's information and command and control network?

Finally, Napoleon's organizational design, information network, and tactics became a legacy that was adopted by many military leaders. The works of Clausewitz and Jomini were influenced by their close proximity to the Napoleonic wars. The Prussian General Staff was based on the model of Napoleon's General Staff. General Robert E. Lee employed many of Napoleon's strategies during the American Civil War. How were these legacies affected by the Industrial Revolution?

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