Preparing for War or Peace?

The Progression of the Arms Race in Central Europe from 1945-1995 within a Quantitative and Qualitative Framework

by

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Introduction

The arms race between the United States and the Soviet Union defined international politics in the latter half of the 20th century. And, although the Cold War has long since subsided, regional arms races between nations have continued with noticeable intensity—the India-Pakistan arms race is a clear example. There is arguably a burgeoning arms race between the United States and China in the western Pacific. An interesting question emerges: why do some arms races lead to instability and then war, when others do not? Political scientists, like Samuel P. Huntington, have attempted to answer this question at the theoretical level. This study of the arms race in Central Europe during the Cold War—the greatest arms race in history—seeks to empirically verify Huntington’s theory on the progression of arms races.

Research Puzzle

The study of arms races is, generally speaking, bipolar in nature. There are a plethora of theoretical, deductive approaches to arms races. On the other end of the spectrum, there are also countless empirical studies of the development of weapons systems between one or more powers and the strategic implications of such systems. There are relatively few studies that combine both theoretical and empirical approaches. An empirical, bottom-up analysis of the progression in force size and structure of weapons systems during a particular arms race can lead to valuable insights into arms race theory. Therefore, the aim of this study is to empirically study the arms race in Central Europe from 1945-1995 within Samuel P. Huntington’s theoretical framework. In other words, this study seeks to determine whether an empirical analysis of Warsaw Pact and NATO forces in Central Europe can corroborate or modify Huntington’s
hypothesis on arms races. Since the Cold War was one of the largest, longest running, and most technologically advanced arms races in history, it can offer implications for current arms races, or ones that have yet to begin. The implications of the progression of a possible US-Chinese arms race have also been examined in the conclusion. In addition, this study sheds light on unintended consequences of arms control measures between competing powers.

**What is an arms race?**

Somewhat surprisingly, there are many different definitions as to what constitutes an arms race within the action-reaction model, which is the model that Huntington employed. Some, like Buzan and Hammond, have suggested that arms races are only the most extreme manifestation of an “arms dynamic” that is the normal interaction between the militaries of different states.\(^1\) The armament goals of a State can either be absolute or relative with respect to the forces of another power; however, arms races can only truly occur when two powers have relative armaments goals. In addition, the term “arms race” itself may be a bit misleading. An arms race is not necessarily a “race” in the simplest sense, since this implies “a grueling contest between two runners straining to do their utmost, which will end when one staggers across the finish line first or when they both drop from exhaustion.”\(^2\) Instead, arms races are more like a series of races, in which nations may choose to compete in some areas but not others. Of course, sustained and focused arms competition between two or more countries lies at the heart of any arms race.

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1 Buzan, Barry, and Eric Herring. *The Arms Dynamic in World Politics.* (Boulder: Lynne Rienner, 1998), 80-81
Arms races don’t necessarily need to have a linear progression in intensity or military procurement, as periods within the competition can vary from intense to relatively tranquil.\(^3\) Nations may also compete in many different areas, such as troop levels and deployments, as well as armament types, with varying degrees of success. The definition of what constitutes an arms race varies among scholars. Grant Hammond has used eight criteria for determining whether or not a particular competition is indeed an arms race, although this is an especially rigorous definition of arms races.\(^4\) Defined in such a way with so many prerequisites, arms races are very rare phenomena. For example, Hammond’s sixth criterion, that a State must devote 8% of its GDP towards military expenditure, is rather arbitrary. On the other hand, Colin Gray’s definition of arms races contains only four criteria, which are the key components of arms races and are included in almost any definition. The first condition is that there must be two or more parties that are conscious of their antagonism. Second, they must structure their armed forces with attention to the effectiveness of the forces in combat with, or as deterrent to, the other arms race participants. Third, they must compete in terms of quantity (men, weapons) and/or quality (men, weapons, organization, doctrine

\(^3\) Hammond, Grant. *Plowshares into Swords: Arms Races in International Politics 1840–1991.* (Columbia, SC: University of South Carolina Press, 1993), 29

\(^4\) Hammond, 31. According to him, arms races require: “1) two or more participants, though the relationship is in essence a bilateral one; 2) Specific designation of an adversary or potential adversary; 3) Military and diplomatic planning based directly on the capabilities and intent of each other; 4) A high degree of public animosity or antagonism between the parties involved; 5) Politico-military linkage of state actions between or among the rival force structures and strategies; 6) An extraordinary and consistent increase in the level of defense effort in excess of 8 percent of GDP per annum; 7) A focus on a particular weapons environment or weapons system vis-à-vis the opponent with an explicit goal ratio; and 8) The purpose of the effort: seeking dominance via intimidation over the rival in politico-military affairs.”
deployment). And fourth, there must be rapid improvements in quantity and/or improvements in quality.\(^5\)

The Cold War in Europe was a complex struggle involving many different levels of competition, and it certainly meets these criteria. From the onset, the United States had an unmatched superiority of nuclear weapons and delivery systems that, despite constant improvement, eventually yielded to rough parity with the USSR by the late 1960s.\(^6\) Soviet defense expenditure decreased from 1951 to 1961, but more than doubled in real terms from 1961 to 1981 in an attempt to match US military power.\(^7\)

**Huntington’s Hypothesis**

The framework for this thesis is Huntington’s theory on arms races, expressed in “Arms Races: Prerequisites and Results”, which he wrote in 1958 in the midst of the Cold War. Huntington’s theory is fundamentally an action-reaction model of arms races. At its core, it proposes that States base their military strength on external factors, especially the forces of another state.\(^8\) States can compete at different levels of armament both quantitatively and qualitatively. Competition, at different levels of armament, focuses on identical or complementary weapons systems that are meant to balance each other.\(^9\)

Huntington’s main aim is to determine when arms races lead to war and when they may substitute for war entirely.\(^10\) The beginning of arms races are not difficult to identify, as they are usually accompanied by a formal change in policy and then force structure, representing changes in a nation’s self-perception of where it ought to be in the

\(^6\) Carnesale et al., 87
\(^7\) Hammond, 225
\(^8\) Buzan, 83
\(^9\) Buzan, 87
\(^10\) Hammond, 274
world political order.\textsuperscript{11} The most widely accepted finding of Huntington’s theory is that the chances of war are greatest at the very beginnings of arms races, as the superior power might attack a competitor in order to prevent any possibility that they may “win” the arms race. If competitors make it past this initial unstable phase, over time, a “static equilibrium” sets in, and expectations of the other power’s intents stabilize.\textsuperscript{12} The probability of war decreases, although Huntington does not specify a timeframe for this.

According to Huntington, there are two types of arms races: quantitative and qualitative. Quantitative arms races aim to create large numbers of a particular weapon, whereas qualitative forces seek to replace existing weapons with newer and more effective ones. Quantitative arms races usually involve the same weapons system, although there can also be complementary arms races in which two different types of forces are meant to combat one another, like tanks and anti-tank missiles. In this situation, however, qualitative judgments are needed in addition to a purely quantitative calculus in order to effectively determine the balance of relative forces.\textsuperscript{13}

If two powers have roughly similar force structures, arms races tend to focus on one weapon system, a “decisive force.” Weapons with the greatest range will generally be the decisive force in combat and therefore the center of competition.\textsuperscript{14} According to JFC Fuller’s \textit{Armament and History}, from which Huntington borrows this concept, a decisive force is described as:

\begin{flushleft}
\textsuperscript{11} Huntington, Samuel P. “Arms Races: Prerequisites and Results.” In \textit{Conflict after the Cold War: Arguments on Causes of War and Peace}. Ed. Richard Betts. (New York: Pearson Longman, 2008), 395
\textsuperscript{12} Ibid, 399
\textsuperscript{13} Ibid, 392
\textsuperscript{14} Fuller, JFC. \textit{Armament and History} (New York: C. Scribner’s Sons, 1945), 22
\end{flushleft}
“the weapon which, on account of its superior range, can be brought into action first, and under the protective cover of which all other weapons, according to their respective powers and limitations, can be brought into play.”

Huntington believes two powers cannot support arms races in more areas than one since the costs associated with a multi-dimensional arms race would be unsustainable—although this is a highly contentious statement that is not clearly supported by past arms races. Indeed, much depends on how arms races are defined and which are included in an analysis.

In a key tenet of his thesis, Huntington believes that quantitative arms races can develop into qualitative arms races if technological advancements produce a new decisive force. This shift towards qualitative competition is made more likely when States have the capacity for technological advancement in the first place. Qualitative arms races are usually not decisive in and of themselves, since the armaments must be produced in sufficient quantity to be effective. Qualitative arms races are generally preferred by the power that is trailing in the quantitative arms race, since it takes fewer resources to shift the decisive force in a conflict. The side perceived to have superior forces, on the other hand, is resistant to change.

Quantitative arms races are said to be inherently destabilizing, since they require a large amount of resources and persistence. By the end, a state will either give up or decide go to war. Untenable economic costs can lead to negotiated ends of arms races. On the other hand, qualitative arms races tend to bring about parity and therefore stability between nations. If one of the competitors in a qualitative arms race shifted to a

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15 Fuller, 21
quantitative build-up of weapons, then “this would be a fairly clear sign that it was intending to go to war in the immediate future.”\(^{16}\)

Arms agreements generally won’t include weapons that are a decisive force, but will rather include a weapon of secondary importance. Similarly, qualitative arms control can shift development towards quantitative forces, and therefore increase the chances for war. A quantitative arms control agreement would likewise shift focus towards qualitative improvements.\(^{17}\) Huntington believes that as technology makes the possibility of a civilization-ending war possible, wars will become less frequent, and arms races longer.

**Hypothesis**

Huntington’s theorem largely predicts NATO and Warsaw Treaty Organization (Warsaw Pact) force sizes and structures in the Central European theater in the early years of the Cold War, but diverges thereafter. The arms race in Central Europe from 1945 to 1965 closely mirrored Huntington’s expectations on the progression of arms races. There existed a predominantly quantitative arms race from 1945 to 1955, as the balance of power in Europe still hinged on conventional superiority. As predicted, this was followed by a shift to a qualitative arms race from 1955 to 1965, as nuclear weapons became the focus of competition.

The period between 1965 and 1975, however, diverges from Huntington’s predictions. A rough state of quantitative and qualitative parity in conventional and nuclear forces shifted to a significant Soviet quantitative and qualitative weapons build-up that cannot be accounted for within his framework. This breakdown of Huntington’s

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\(^{16}\) Huntington, “Arms Races: Prerequisites and Results,” 404
\(^{17}\) Ibid, 410
arms race predictions suggests that there are other factors at play. The sequential nature of Huntington’s thesis of qualitative arms races leading to stability can therefore be challenged: nations may decide to “breakout” despite having achieved force parity at the strategic level. It is possible that the balance of power at the strategic nuclear level can cause shifts in competition to lower armament levels.

The later stages of the Cold War from 1975-85 saw a return to a quantitative and qualitative build-up on both sides, followed by an end to the arms race between 1985 and 1995, when the arms race became unsustainable in the Soviet Union (Russia after December 1991) for a variety of reasons. This later stage more closely follows Huntington’s quantitative-qualitative thesis predictions.

Alternative Hypotheses on Arms Races

There is much scholarly debate over the nature of arms races. Huntington’s thesis is by no means the definitive theory on arms races, and in fact many of his assertions remain contested. While the reaction-action model is used by Huntington to explain the behavior of states in arms races, the domestic structure model offers a competing interpretation of the arms “dynamic” between two states. Colin Gray, among others, has argued that the action-reaction model is only one explanatory factor in arms races. The domestic structure model rests on the idea that the internal politics and economics can explain the foreign policy of states. For arms races in particular, it was introduced in the 1970s as an alternative to the action-reaction model to explain the behavior between the US and USSR. The power of Congress to control military spending, bureaucratic infighting within the military, and ideological splits between hawks and doves all have an

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18 Gray, 40
impact on the course of any arms race—as they did during the Cold War.\textsuperscript{20} Both the United States and the Soviet Union maintained forces even after they had become obsolete, thus slowly adding to their force sizes.\textsuperscript{21} Without taking these variables into consideration, the action-reaction model leaves significant gaps. For example, the action-reaction model by itself may not explain the degree of reaction for any given action by an opposing force.\textsuperscript{22} The supposed strategic “bomber gap” of the early 1950s led to an overproduction of B-52s. Although the action-reaction and domestic structure models are complementary and not mutually exclusive, it was argued that the arms competition had become so integrated into the military and political cultures of both countries that arms development had become routine and anticipatory, and not based on discernable actions by either side.\textsuperscript{23}

Within the action-reaction model, Huntington’s hypothesis was partly tested by Grant Hammond, and the notion that arms races stabilize as they progress was generally found to be true. However, he has criticized Huntington’s qualitative versus quantitative distinction. After all, qualitative arms races eventually progress into quantitative ones. Moreover, the qualitative versus quantitative paradigm may lose its importance if the arms race does not hinge on a decisive force or if it is a multilateral arms race.\textsuperscript{24}

Buzan and Herring believed that while a differentiation between quantitative and qualitative characteristics of weapons is important, factors such as “morale, strategy,

\textsuperscript{21} Ibid, 2
\textsuperscript{22} Ibid, 2
\textsuperscript{23} Buzan, 81-101
\textsuperscript{24} Hammond, 48
logistics, or alliance politics” could also be considered just as important. They questioned Huntington’s assertion that quantitative arms races increase the chances for war in and of themselves, as increases in military size may be an effect of increased tensions. John Mueller also believed it is difficult for Huntington to control for endogenous factors. In some cases, States may in fact decide to arm themselves when they believe that war is inevitable. Buzan and Herring have argued that Huntington’s theory will probably work best in bilateral arms races that center around a single main weapons system.

Richardson was the first to try to mathematically define an arms race within the action-reaction model, although it has been criticized for being too crude. He relied on inputs of hostility between two States and GNP levels in order to predict the intensity of an arms race.

Determining whether or not a particular arms race is quantitative or qualitative in nature depends in large part upon the time period selected for study. Huntington’s insistence that arms races largely center on a “decisive force” is due to the shorter time-period he ascribes to arms races. In the 12 arms races he examined, which had run their course, the average duration of each was 11.6 years, with a minimum duration of 3 years and a maximum of 26 years. The longest arms race, between France and England between 1840-1866, was also the earliest, with the slowest relative rate of technological

25 Buzan, 88  
26 Ibid, 88  
28 Buzan, 88  
29 Gray, 50  
30 Ibid, 49
change.\textsuperscript{31} This could seriously affect his results. During arms competition, according to Gray, there are “periods, perhaps lasting several years, in which the design of most weaponry is in a state of flux, followed by relatively long periods of quantitative competition based on the qualitative plateau attained.”\textsuperscript{32} Thus, the way in which an arms race is defined could render it qualitative or quantitative. In the modern age, arms races tend to flow rapidly between both classifications.\textsuperscript{33} Once qualitative advancement has slowed, a State will build more of that weapon. In this sense, qualitative races shift the decisive force, while quantitative races increase the strength of pre-existing decisive forces. For Huntington, arms races are much less dynamic since he places particular arms races into relatively brief time spans.

Moreover, nuclear weapons have a unique effect on the quantitative-qualitative balance of forces, as they contain both inherently qualitative and quantitative aspects. On the one hand, nuclear competition deemphasizes other forms of war, “by rendering the conception of the nation in arms or in arsenal absurd,”\textsuperscript{34} since just a few nuclear weapons can render unacceptable levels of damage. At the same time, “its striking power is so great that quantity rather than quality of weapon power is, in a given time, more likely to achieve the enemy’s annihilation.”\textsuperscript{35} Thus, there seems to be a qualitative plateau in strategic nuclear weapons.

A research-driven view of arms races can provide further insight into a theoretical analysis of Huntington’s thesis. The Soviet Union generally followed the course of US

\textsuperscript{31} Mueller, 17
\textsuperscript{32} Gray, 47
\textsuperscript{33} Hammond, 247
\textsuperscript{34} Fuller, 190
\textsuperscript{35} Fuller, 190
qualitative advancement. In other words, Soviet weapons R&D emulated the technological progress of the US, and thus could be said to be in a perpetual state of reaction to US action. Development of the fission and fusion bombs fall within this category, while other R&D by the Soviets was for the sole purpose of creating a complementary force to counter a US threat, such as their development of ABMs.

Soviet military institutions, like US institutions, maintained a powerful position within domestic politics and acquired their own unique time-patterns towards weapons development. If one follows Huntington’s quantitative-qualitative framework, Soviet emulation of US technology would make sense until parity had been reached, but no longer a predictive model if the Soviets did not initiate significant independent qualitative advancement.

**Operational Plan**

Analyzing the full spectrum of defense expenditures and military improvements of the United States, the USSR, and their allies accurately and consistently would very well be a quixotic exercise. Therefore, in order to test Huntington’s hypothesis, this study will be confined to Central Europe. This includes all Warsaw Pact forces in East Germany, Poland, Hungary, and Czechoslovakia. NATO forces included are those in West Germany, Denmark, Belgium, the Netherlands, and Luxembourg. Conventional forces and tactical nuclear units of the US, UK, France, Canada, and the Soviet Union stationed in this area are included. This being said, the force structure of the US and the Soviet Union will be the most important subjects of this study due to their size and strength in comparison with their European allies. The large concentration of NATO and

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37 Holloway, 148
Warsaw Pact forces in the relatively small area of Central Europe provides ample data for measuring quantitative and qualitative growth in the armed forces of both sides. Forces stationed in this area represent what both sides were willing to devote to combat in case war were to erupt. And, because both superpowers had large nuclear deployments in this area, it represents a good case study for examining the tactical nuclear arms race as well.

A conscious decision was made to exclude strategic nuclear forces from consideration as they largely fall beyond the scope of Huntington’s thesis—unless their deployment directly affects the European military balance. Huntington’s dataset was largely based on theater weapons, whereas strategic nuclear weapons represent a fundamentally different form of combat. For the first time in history, civilizations could be destroyed at the push of a button, and as such, the threshold for parity with regard to nuclear weapons is much lower. Indeed, even if the United States had a nuclear quantitative advantage in the 1950s and 1960s, just a few Soviet nuclear missiles launched against the United States would kill millions of Americans. Above a certain number, a band of parity can be said to exist between powers engaged in a nuclear arms race. After this point, there is no usable nuclear superiority, and therefore the arms race at this level is relatively meaningless and can be contributed to domestic considerations. The nuclear forces of each side, in the words of Churchill, were “more than enough to make the rubble bounce many times over.”

There are various levels of armament in military affairs, ranging from the tactical to grand strategic. Each level of warfare requires different forces. For example, ICBMs were one aspect of a strategic nuclear armament as they represent high-yield and long-

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38 McNamara, Robert. *Blundering into Disaster.* (New York: Pantheon Books, 1986), 42
range nuclear forces that are used against a nation’s homeland. Tactical weapons are those used on the battlefield, such as tanks or infantry. The term “tactical nuclear weapon” is a bit misleading as these are more than purely tactical weapons meant for the battlefield alone. Tactical nuclear weapons represent lower-yield short to medium range nuclear weapons, and were aimed at both military and non-military targets.39 These distinctions in armament levels are important to this study, since competition during the Cold War can be found in many different weapons at different levels of combat. In the words of Edward Luttwak, “each level has its own reality but is rarely independent of the levels above and below it.”40 A key finding of this study is that arms races at any level of combat can influence other arms races at different levels of combat.

Similarly, decisive forces can change over time as a result of changing military strategy. For example, the strategy of “massive retaliation” in the Eisenhower administration shifted deterrence against a Soviet attack of Europe onto US strategic and tactical nuclear weapons. In this period, theater and tactical nuclear weapons could be considered a decisive force. Moreover, changes in the nuclear strategic capabilities of both the Warsaw Pact and NATO caused shifts in the decisive force at the theater level. The ability of the Soviet Union to directly strike the United States precipitated the adoption of “flexible response” in the Kennedy administration, which placed a greater emphasis on conventional weapons as decisive weapons in the defense of Europe.

Therefore, in a split from Huntington’s precept that arms races must hinge on one type of decisive force, a thorough analysis of the Cold War will require a more sophisticated measure. Within the fifty-year time-span of the Cold War, there were a

series of arms races—much like separate sprints in a track meet. Furthermore, as arms races can exist at different levels of combat, a multi-weapon “decisive force” measure is needed. Nuclear capable aircraft and artillery, as well as surface-to-surface missiles, are counted as tactical nuclear weapons, and will be considered as decisive forces, along with conventional force size and structure.

Decisive forces need not be identical to be compared, but may also include complementary forces that are designed to counteract one another in combat. The size and quality of decisive forces will provide for an accurate measure of the nature of the arms race and its intensity. Quantitative measurements are relatively easy, and only require aggregating force levels of a particular set of weapons. Budget levels, although by no means a definitive indicator, can provide clues to the nature of the arms race.

According to Huntington, increases in military budgets should correspond to either a quantitative race or a qualitative race while trying to maintain the pre-existing force structure.\(^4^1\) Rapid increases in weapon turnover can signify that an arms race is predominantly qualitative, while an expansion of forces would suggest that it is quantitative. Measuring the proportion of newer generations of nuclear weapons within Warsaw Pact and NATO inventories can provide a basis for qualitative measurement. The individual capabilities of each weapons system vis-à-vis their predecessors are also considered in order to provide a more nuanced picture of qualitative characteristics of Warsaw Pact and NATO forces.

\(^4^1\) Huntington, “Arms Races: Prerequisites and Results,” 407
*Constraints*

It is important to recognize that there are limits to what can be discerned through an empirical analysis of force trends in Central Europe. Undoubtedly, there is a large amount of information concerning force size, structure, and deployment of weapons systems in Central Europe. Unfortunately, facts and figures from the Cold War found in open source materials are estimates and as such can vary by wide margins. For this study, *The Military Balance*, published by the International Institute for Strategic Studies, is an invaluable source and was highly regarded by both sides in the Cold War. Recently declassified US military documents allow for a clearer picture, yet this only represents one side of the coin. Militaries, by their very nature risk-averse, often overestimate the size and capability of their opponents. Regardless, arms races do not rely exclusively on facts and figures, but also perceptions. Actions are “based on what people think to be true, not necessarily truth in itself.”  

Therefore, despite the inevitable limitations to some of the data within this study, it may nonetheless be possible to paint a broad picture in force sizes and structure over the course of 1945 to 1995.

Externalities are also a point of valid criticism. To some extent, the arms race in Central Europe cannot be viewed apart from the wider global conflict. Budgetary constraints, conflicts from Vietnam to Afghanistan, and domestic politics undoubtedly affected armament levels within Central Europe. However, these alternative causes need not be mutually exclusive, but rather can be incorporated into Huntington’s action-reaction model.

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42 Hammond, 223
**Organization**

Most scholars have organized the Cold War into distinct phases. Richard Smoke used a fluid approach that outlines initial US nuclear superiority, a period of stability, and then a resurgence of Soviet-US competition in the 1970s.\(^{43}\) The Harvard Nuclear Study group, which published its work in 1983, divided the Cold War into five different periods from 1945 to the early 1980s. The first, from 1945-1957, was one of unchallenged US nuclear superiority. In 1957-1962 this superiority was challenged by the introduction of new Soviet bombers and ICBMs, although quantities of nuclear weapons remained low.\(^{44}\) Then, unquestioned US nuclear superiority was weakened considerably from 1962-1970. By 1970-1977, parity had been reached. 1977 and onwards (the study was created in the 1980s) saw the state of parity being hotly contested by the Soviets, and it was unclear as to how the US would respond.\(^{45}\)

For the purpose of this thesis, the analysis on NATO and Warsaw Pact nuclear and conventional force trends has been organized into five ten-year periods from 1945-1995. Although the total length this period is slightly longer than the traditional duration of the Cold War (1946-1991), it divides the arms race into consistent time-periods, as well as accounts for the continuing drawdown of Russian forces after the collapse of the Soviet Union. This study examines the force trends in each ten-year period, and then concludes with overall trends and findings as well as implications for a potential US-Chinese arms race.

\(^{43}\) Smoke, chap. 5-13  
\(^{44}\) Carnesale et al., 82  
\(^{45}\) Ibid, 95
Chapter I: 1945-55

**Unchallenged US Technological Superiority and the Formation of NATO**

In the years immediately after WWII, the United States did not readily commit to the defense of Europe in the event of a Soviet invasion; to the contrary, there was a rapid demobilization of US forces in Europe following WWII. During the late 1940s, the US had strategic bombers located in the UK, and in 1949, there were a total of 100-200 atomic bombs that could be targeted at Soviet industrial capacity, as first outlined in the JCS Short Range Emergency Plan 1844/13. Surprisingly, there was no protocol for their use in case of a Soviet invasion of Western Europe; in fact, the contemporary US military strategy was to retreat from the continent in order to prepare for a counterattack. No unified war plan among European nations and the United States yet existed.

Even into the late 1940s, many political leaders in Western Europe still believed the biggest threat to peace was a resurgent Germany. To prepare for this eventuality, the Brussels Pact was signed between Britain, France, and the Benelux countries on March 17th 1948. It was a 50-year mutual defense treaty in case of any future German aggression. To the growing worry of policymakers in Washington and Europe, no such treaty existed to counter the growing Soviet threat—only Truman’s verbal assurances.

The Berlin Blockade of 1948-49 and Stalin’s bellicose acts sparked the need for a re-evaluation of the strength of military forces that would be required for the defense of Western Europe. A common defense of Europe, which would have significant

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46 Carnesale et al., 78
49 Judt, 149
conventional forces, was needed to counter Soviet forces. Thus, in 1949, the North Atlantic Treaty created NATO. Belgium, Britain, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal and the United States signed the treaty. Turkey and Greece would join in 1952 and West Germany in 1955. NATO was to provide for the communal defense of all member states.

After the creation of NATO, the United States committed significant resources to the rearmament of Western Europe. The increase in defense spending was notable even in light of the Korean War (1950-53). The US defense budget rose from $15.5 billion in August of 1950 to $70 billion by December 1951. Defense spending as a percentage of GNP rose from 4.7% in 1949 to 17.3% in 1953. Western European defense spending increased as well—Britain and France were spending roughly 10% of GNP on defense in 1952. At the same time, military assistance to European allies was around $5 billion.

The original aim of NATO was to increase the size and strength of conventional forces for the defense of Europe. A NATO white paper from December 1952 stated that “the land defence should be aggressive, making full use of local opportunities for offense.”50 The Lisbon force goals of 1952 called for conventional land forces to be increased from 25 to 96 divisions in two years.51 While NATO’s 1952 Lisbon force goals were never realized, West Germany was eventually rearmed in 1954 over the protestations of France.52

52 Judt, 152-153
When it became clear that European conventional forces would not be increased in the short-term, the United States and NATO placed more emphasis on nuclear weapons in order to shore up the defense of Europe. In any event, it would hardly matter. In the beginning years of NATO the western powers were still outnumbered 12:1 by Soviet forces.  

In the face of this extremely high numerical disadvantage, the United States used its nuclear forces in order to compensate for its conventional weakness. Yet this was hardly feasible in the short term in case a Soviet invasion actually occurred. In fact, the United States could still not capitalize on its atomic technology during the early stages of a crisis, as it took 180 days for an atomic bomb to be assembled and transferred overseas. Military plans devised to cripple the Soviet industrial-military complex had no reliable estimates about how many bombs would be available. The US Chiefs of Staff reported in 1949 that it would take at least until 1957 to mount an effective defense of the Rhine against any Soviet incursion. According to Tony Judt, “it was by no means inappropriate that at the NATO Treaty-signing ceremony in Constitutional Hall…the band played ‘I’ve Got Plenty of Nothing.’” Thus, the considerable strategic nuclear advantage that the United States possessed at the time had little immediate value in case of a Soviet invasion.

The first manifestations of the larger strategic arms race were beginning to appear at this time. In 1949, the USSR detonated its first nuclear device, and in response, Truman approved development of the hydrogen bomb. Thereafter, the Soviets were quick

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53 Judt, 150  
54 Borgiasz, 14  
55 Judt, 150
to produce a thermonuclear device themselves, and detonated their first in 1953, only one year after the Americans. However, US nuclear superiority remained, especially in delivery systems.\textsuperscript{56}

\textbf{The Soviet Union and the Red Army}

By the end of the Second World War, the Soviet Union possessed the largest armed force in the history of Europe.\textsuperscript{57} However, following WWII, the size of its armed forces rapidly decreased. In 1948, the Soviet Army decreased in size from 15 million men-at-arms in 500 divisions to approximately 4 million troops in 175 divisions. Despite this decrease in Soviet force strength, if Stalin so desired, there was nothing to stop an advance all the way to the Atlantic coast.\textsuperscript{58} Although a formidable force by any measure, these large numbers hid a certain weakness in the Soviet Army. Soviet forces, immediately after the war, had a low degree of mechanization, and most units travelled on foot, horse, or train.\textsuperscript{59} For many in the Red Army, the quality of equipment was not very far removed from Napoleonic campaigns.

This downward trend in Soviet forces would not last for long. As US-Soviet relations rapidly deteriorated, a high priority was placed on maintaining a strong presence in the European theater in response to US nuclear superiority. At the earliest stage of the Cold War, the Soviet Union increased its reliance on conventional forces. As the Soviet Union did not have any nuclear capability, conventional force was its only possible counterbalance against this US threat. In order for the Soviets to maintain a credible

\textsuperscript{56} Carnesale et al., 79
\textsuperscript{57} Judt, 117
\textsuperscript{58} Judt, 117. A popular joke of the time asked, “what does the Red Army need to reach Paris?” The answer was “shoes.”
balance with Western forces, its ground forces had to remain large. From a postwar low of 2,874,000 men in 1948, Soviet forces were actually increased in 1949, and in 1950, Soviet forces were re-organized for modern warfare. Soviet strategy demanded that theater forces be trained and equipped for campaigns in Europe—especially for those forces already stationed there. Around thirty Soviet divisions were placed in Eastern Europe, with twenty-two in East Germany. Between fifty and sixty Soviet divisions were located in the USSR to the rear. The battlefield mobility and firepower of these forward-deployed forces was increased through motorizing troop transport and strengthening armored divisions, notably with the introduction of the T-54 tank. Furthermore, of the 1,700 aircraft co-located with the GSFG, 500 were MiG-15 jet fighters and 211 IL-28 light jet bombers.

By 1953 Soviet forces were comprised of around 1,500,000 men in Europe alone, although they largely possessed WWII era materiel. Above all, the Soviet aim was to integrate the force structures of Eastern European countries and in “laying the basis for the standardization of equipment and procedures.”

**The Burgeoning Arms Race: A Quantitative Focus**

The fact that the Soviet Union and the United States began to view one another as strategic adversaries with increasing intensity in the aftermath of the Second World War is quite apparent. As Huntington details, the onset of arms races is commonly accompanied by a noted change in State policy and force structure. Indeed, the Soviets

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62 Wolfe, 34
63 Ibid, 39
64 Ibid, 39
65 Ibid, 39
66 Ibid, 43
and the Americans responded to one another’s force structure—the Soviets by revamping their forces in 1949, while the Americans pushed for a stronger alliance with Western European States, at least on paper. While the United States relied on strategic bombers to deliver nuclear weapons to the Soviet Union, it is clear that this was never clearly thought out, as logistical details were murky at best. Instead, any defense of Europe would have to eventually be conventional in nature—and the Joint Chiefs of Staff realized this when they admitted in 1949 that it would take at least until 1957 to liberate Europe from a Soviet invasion.67 This is why, at the Lisbon Summit in 1952, the U.S. pushed for an expansion in the conventional size of European nations, and supported the rearmament of West Germany in 1954. The Soviet Union, too, rapidly increased the standing size of their armies in Central and Eastern Europe beginning in 1949. Thus, the first years of arms race in Central Europe had a quantitative focus.

Much as Huntington theorized, the chances for war during this time were high. General Clay, the military governor of US-controlled Germany, detailed the instability of the newborn Cold War in 1948: “For many months, based on logical analysis, I have felt and held that war was unlikely for at least ten years. Within the last few weeks I have felt a subtle change in Soviet attitude which I cannot define, but which now gives me a feeling it may come with dramatic suddenness.”68 The distrust was mutual, as Arthur Schlesinger, Jr. points out in his historical review of the period: “Stalin and his associates, whatever Roosevelt or Truman did or failed to do, were bound to regard the United States as the enemy, not because of this deed or that, but because of the primordial fact that America was the leading capitalist power and thus, by Leninist syllogism,

67 Judt, 150
68 Judt, 149
unappeasably hostile.”

That the beginning of an arms race between these two powers would be most instable at this early point in the Cold War—before the actions of both sides could become more understood to one another—is therefore understandable. For this, Huntington’s arms race theory corresponds extremely well with the turn of events.

The Soviets, already possessing a massive army and the means to arrive to the Atlantic if Stalin so wished, slowly began to shift their focus from conventional predominance to developing their strategic capability by the mid-1950s. It is within this context that Stalin famously quipped that intercontinental missiles would be “an effective straitjacket for that noisy shopkeeper Harry Truman.”

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Chapter II: 1955-65

A Qualitative Arms Race: the Introduction of Tactical Nuclear Weapons

The period between 1955 and 1965 saw the introduction of tactical nuclear weapons into the European theater by the United States and the Soviet Union. Both sides, in military doctrine and force posture, reduced the role of conventional forces while increasing the scope and use of nuclear weapons. This was especially true for NATO, as there was a striking increase in the reliance on tactical nuclear weapons over ground forces. NATO and the United States exponentially increased the size of tactical nuclear forces. Nonexistent in the early 1950s, by 1965, NATO tactical nuclear weapons in Europe numbered in the thousands (double the number in 1961). Delivery vehicles, such as aircraft and missiles, likewise increased in the same period to approximately 2,500.71 The Soviet Union did not increase its tactical nuclear forces in Europe as rapidly, since their priority was placed on developing sufficient levels of strategic nuclear forces with their limited amount of fissile material. Nevertheless, the numbers of Soviet tactical nuclear weapons in the European theater were certainly in the high hundreds, which was more than enough to cause incomprehensible damage.

The United States and NATO

Changing technology, which allowed for the possibility of nuclear weapons that could be delivered with increasing range, accuracy, and yields, caused a corresponding change in US military doctrine involving tactical nuclear weapons. Eisenhower’s “new look,” first outlined in 1953, sought to reduce US military spending by relying on a massive nuclear retaliation on Soviet territory to deter an invasion of Europe. The deployment of theater and tactical nuclear weapons to Europe was first authorized on

July 1, 1953 in a Top Secret memorandum from the Joint Chiefs to the Supreme Allied Commander of Europe. Tactical nuclear weapons were needed in order to strengthen the deterrent effect of US forces and counter the conventional disparity of forces. This memo authorized the introduction of nuclear artillery, surface-to-surface missiles, and nuclear capable aircraft carrying roughly 250 individual 20-kiloton warheads.

The “massive retaliation” strategy of the Eisenhower administration soon needed to be amended. Advancements in Soviet missile technology enabled the USSR to directly strike the United States. The credibility of “massive retaliation” was in doubt, as many European leaders questioned the United States’ commitment to their defense in the face of the large number of expected American casualties. As a result, the US decided that a “one size fits all” nuclear response to any Soviet invasion was untenable. Therefore, the massive retaliation strategy was replaced by Kennedy’s “flexible response” in 1961.

Overall, the aim of flexible response was dual pronged: it sought to increase US latitude in responding to a Soviet invasion with nuclear weapons, while encouraging European States to increase their own military capabilities and cooperation in the hopes of drawing-down US forces. Of course, flexible response required that a diverse array of tactical nuclear weapons be deployed in Europe. In fact, from 1961 to 1964, NATO’s deployment of tactical nuclear weapons in Europe increased by 60%.

Nuclear artillery was one of the very first tactical nuclear weapons systems to be introduced into the European theater, as it was the most reliable delivery system at the time. NATO had a monopoly on the use of nuclear artillery until 1975 when the first

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72 Carlton, David. *The Dynamic of the Arms Race*, 136
74 Ibid
Soviet system was introduced. The US M-65 280mm atomic cannon was introduced to Europe in 1953. The artillery shell was essentially a “Little Boy” atomic weapon (with the same basic design as the Hiroshima bomb) that was modified to fit into a cannon. The weapon system itself was transported on two opposite facing tractor-trailers with the cannon in between them. It had a range of 17 miles. Other US nuclear artillery cannons were variants of WWI and WWII era 203mm and 155mm Howitzers. The M-28 and M-29, part of the US “Davy Crockett” battle group, were the smallest of US tactical nuclear weapons. Fielded in 1961, these were essentially recoilless rifles that were meant to be used in infantry formations and on light armored vehicles, such as Jeeps. To give a sense of its limited destructive power relative to other nuclear weapons, the M-28 had a yield of only 250 tons of TNT (0.25 kilotons) and a variable range of up to 2 kilometers. In comparison, the explosive yield of the Hiroshima bomb was approximately 15 kilotons.

Western missile systems and designs evolved rapidly during the 1950s and 1960s, largely because many first generation designs proved unreliable in tactical and theater environments. The first “Honest John” missile system (MGR-1/1B) became operational in 1954, with the improved version coming into service in February 1960. These weapon systems were widely deployed among NATO forces at the brigade and divisional levels. The Honest John was shortly replaced by the Lacrosse MGM-18A, which was deployed in US and French forces beginning in 1964. It was much more accurate than the Honest John, with a circular error probable (CEP) target of only 40 meters, as opposed to a CEP

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76 Ibid, 22
77 Ibid, 22
of roughly 400m for the Honest John.\textsuperscript{78} As the 1950s progressed, US missile systems increased in variety, sophistication, and complexity. Guidance systems, reliable and storable fuels, and range all saw improvements.\textsuperscript{79} The Redstone missile was used exclusively by US forces and was first deployed in 1958 at the brigade level. It was transported on a tractor-trailer and featured a hoist system for vertical launch, and had a range of 200 miles.

By the early 1960s, Pershing and Sergeant tactical surface-to-surface missiles began to replace the Redstone and Corporal missiles. The Sergeant had the same range and accuracy as the Corporal, but was smaller in size and therefore easier to transport. The Pershing I had an increased range of 460 miles and entered service in 1962. The Matador missile was the first cruise missile to be used by the US army, and reflecting the heavy influence of German technology in the 1950s, bore a close resemblance to the V-1 rocket. The Matador evolved into the Mace missile, which was first introduced in 1957. Both were winged, rocket boosted, jet-powered weapons. The Mace B carried a significant improvement in guidance technology, with ATRAN, an early type of terrain radar.\textsuperscript{80}

In 1955, the F-84 F Thunderjet was the first nuclear-capable tactical aircraft to be deployed in Europe, but was quickly replaced by the F-86 Sabrejet—three squadrons of which operated out of West Germany.\textsuperscript{81} The Sabrejet was, in turn, replaced by the F-100 Supersabre. Their number rose quickly in Central Europe, from a force of 120 in 1958 to 270 as a result of the 1961 Berlin crisis. In 1963, 949 F-104 Starfighters were introduced

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\textsuperscript{78} Ibid, 39 \\
\textsuperscript{79} Ibid, 39-40 \\
\textsuperscript{80} Ibid, 49 \\
\textsuperscript{81} Ibid, 65-68
\end{flushleft}
into the European theater, with 604 going to West German forces, 125 to Italy, 120 to the Netherlands, and 100 to Belgium. 82

The Soviet Union and the Creation of the Warsaw Pact

It was in this period that the Warsaw Treaty Organization (aka Warsaw Pact) was created, both to integrate the force structures of the Soviet Army and its protectorates in Eastern Europe, as well as to control their militaries more effectively. The “Treaty of Friendship, Mutual Assistance, and Co-operation” formed the Warsaw Treaty Organization on May 14, 1955. The USSR, along with Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania were members. In addition, the USSR signed separate status-of-forces agreements with Poland, East Germany, Romania and Hungary between 1956 and 1957. Therefore the defense of Eastern Europe by the USSR was not solely dependent on the Warsaw Treaty. 83

The Warsaw Pact was organized into two subordinate entities that were located in Moscow: the Political Consultative Committee and the Joint High Command. The former essentially handled political matters and consisted of the First Secretaries of the Communist Party, Heads of Government and Foreign and Defense Ministers of member-states. The Joint High Command handled military affairs, and the Commander in Chief and Chief of Staff were always Soviet officers. Soviet forces in the European theater were organized into four groups. The Northern Group of Forces was headquartered in Legnica, Poland; the Southern Group of Forces, located in Budapest; the Group of Soviet

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Forces in Germany, based out of Zossen-Wünsdorf, near Berlin; and the Central Group of Forces, based near Prague.  

The Soviets had at this time begun developing nuclear capable weapons systems of their own in order to challenge US dominance. In Soviet military doctrine, the period from 1953-1960 is recognized as a revolutionary period in which nuclear forces were introduced into the Soviet military. This period not only saw the development of Soviet ICBMs and strategic bombers, but also the development of tactical nuclear weapons. The introduction of nuclear surface-to-surface missiles into the Soviet arsenal more closely followed their introduction into US forces, when compared to other tactical nuclear weapons, because both sides had roughly equal access to German rocket technology from the Second World War.

The Soviet Union spent considerable effort in integrating nuclear forces into its force structure. Nuclear weapons were incorporated down to the divisional level. The Soviets mainly relied upon missiles and tactical aircraft for delivery of tactical nuclear weapons. In 1955, the SS-3 medium range ballistic missile (MRBM) began to be deployed. The SS-1 “SCUD A” and the FROG-1 became operational in Central Europe in 1957. The SCUD A contained storable liquid fuel, a radio-guidance system, and had a range of 150 km. Since it was radio-guided, it depended on ground control to shut off

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85 Hansen, 22
86 In the Khrushchev era it was assumed that any large-scale conflict in Europe would rely on heavy exchanges in nuclear weapons from both sides. As opposed to Stalin’s strategic defense and then massive counter-attack, in this era Soviet strategy was based on “prompt seizure of the initiative and rapid offensive exploitation.” For a more in-depth discussion of Soviet military strategy during this period, see Wolfe, 197-208.
87 Wolfe, 173
88 Holloway, 66
89 Hansen, 26
its propulsion system instead of having an internal guidance system, which meant it was quite inaccurate.\footnote{Karber et al., “Trends in the Deployment of Nuclear Weapons in Central Europe: 1948-1988”, 55} The shorter-range and smaller FROG-1 was a liquid-fueled, single stage missile that had a range of 32 km. By 1963, the total number of Warsaw Pact MRBM\textquotesingle s was approximately 750, although their accuracy was notably inferior to their US counterparts.\footnote{The Military Balance 1963-1964}

There were some problems associated with fielding theater nuclear weapons. The SS-4 and SS-5, introduced in 1959 and 1961 respectively, became increasingly vulnerable to preemption by NATO forces. As satellite reconnaissance became widely used, the locations of missile sites could be reliably identified. And, as missiles were usually clustered together, they could be more easily destroyed. In a possible nuclear confrontation, the Soviet strategy favored preemption; however, the SS-4 and SS-5 took between eight to twenty four hours to become operational. Therefore, it was unlikely that they could be rapidly mobilized and fired in the event of a surprise attack.\footnote{Holloway, 69} These drawbacks were minimized with the introduction of the SS-14 MRBM and SS-15 MRBM introduced in 1965, as they were an early version, mobile theater missile. However, these were not deployed in sufficient numbers to have much impact.

The IL-28 “Beagle” tactical bomber first entered service in 1950. It was the first and only nuclear-capable Soviet tactical aircraft deployed in Europe until the Yak-28 “Brewer” was deployed in 1958.\footnote{Karber et al., “Trends in the Deployment of Nuclear Weapons in Central Europe: 1948-1988”, 82} In 1952, up to 290 IL-28s were deployed in Eastern Europe, and it was supplied to other Warsaw Pact member states as well. The Yak-28 “Brewer”, on the other hand, was not shared with allies. Nuclear-capable tactical aircraft...
were not nearly as important to the Soviet force structure as it was to US and NATO forces, as there were only 48 Yak-28s deployed in Europe from 1960 to 1970.\textsuperscript{94} In fact, the Yak-28 could not carry conventional weapons because of “intentionally nuclear-dedicated design features.”\textsuperscript{95} Its lack of dual capability most likely contributed to its low numbers in East Europe.

For various reasons, the Soviet Union placed a strong emphasis on the development of theater nuclear weapons that were able to target US and NATO military installations in Europe. First, most nuclear weapons aimed at the Soviet Union were in Europe. Second, early generation bombers either did not have sufficient range to successfully return from attacking the United States, such as the Myasishchev-4 “Bison,” or were too slow and vulnerable to air defenses, such as the Tu-95 “Bear.” Missiles did not share these weaknesses. Third, Soviet leaders were convinced that merely threatening the destruction of Europe would deter an attack from the United States.\textsuperscript{96} In Khrushchev’s mind, the assured destruction of Europe was an insurance policy against attack.\textsuperscript{97}

For Khrushchev, incorporating tactical nuclear forces into the Soviet military provided for an opportunity to reduce the size of conventional theater forces. As in any large bureaucracy, his view for a change in doctrine and force posture met substantial friction within the Soviet military establishment. Marshal Zhukov, for one, viewed nuclear weapons as subordinate to large ground armies, and did not believe the size of

\textsuperscript{94} Karber et al., “Trends in the Deployment of Nuclear Weapons in Central Europe: 1948-1988”, 84
\textsuperscript{95} Ibid, 84
\textsuperscript{96} Holloway, 67
\textsuperscript{97} Ibid, 67
conventional forces could be reduced without compromising Soviet security. As a compromise between these viewpoints, conventional forces in Central and Eastern Europe, while initially remaining large, were structured to fight a nuclear war in the late 1950s. Thereafter, to accommodate for the preeminence of nuclear weapons in Soviet strategy, Khrushchev carried out several troop reductions between 1955 and 1960. Only until 1960, when Khrushchev formally declared a new Soviet military strategy during his speech at the USSR Supreme Soviet Session on January 15, 1960, did his plan to restructure conventional forces to accommodate nuclear weapons find serious resistance among traditionalists, who favored a large conventional force.

There were three distinct troop reductions under Khrushchev’s tenure. In the period between 1955 and 1957, troop levels were reduced from 5.7 million to 3.86 million—a reduction of about one-third. The second reduction, between 1958 and 1959, cut 300,000 men from the total figure, bringing Soviet manpower to 3.6 million men, with a further reduction of 300,000 by 1962. This reduction also involved withdrawals in some areas of Eastern Europe, such as Romania. The third and most contentious troop reduction occurred in 1960, after Khrushchev’s public announcement at the Supreme Soviet. The total amount of men in the armed forces was to be progressively

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98 Wolfe, 161
99 Ibid, 161
100 Ibid, 162
101 The Military Balance 1962-1963
102 Wolfe, 165
103 Khrushchev’s modernization program was met with resistance within the Soviet military establishment. The increased reliance of the Soviet military on tactical nuclear weapons for any conflict in central or Eastern Europe worried the traditionalist camp, which favored the maintenance of large, conventional armies. Prominent traditionalists, like Marshal Rotnistrov, “had become more vocal, pointing to the danger that ‘calculations based on the anticipated results of using a single new type of weapons alone can lead to erroneous conclusions’ and that too great an emphasis on missile technology would hurt technological advancement of conventional weapons. (Wolfe, 162) Further, many in the Soviet military feared that an
reduced from 3.6 million to 2.4 million, although this reduction was suspended after the
Berlin Crisis, at which time approximately 600,000 troops had been cut. The reduction in
the European theater, although substantial, was less dramatic. Roughly 70,000 Soviet
troops were withdrawn from East Germany from 1955 to 1958.\footnote{Wolfe, 165-166}

Manpower and tanks during this period were significantly reduced, which can be
attributed both to a greater reliance on nuclear weapons and getting rid of obsolete World
War II era equipment.\footnote{The BDM Corp. Net Assessment of the Maturing Soviet Threat in Ground Forces, 8}
Total strength of tank forces were estimated at 20,000 front-line
tanks and 15,000 second-line tanks.\footnote{The Military Balance, 1962-1963, 6}
At the same time that the Soviet military was
reducing the size of conventional forces, an emphasis was placed on modernization of the
“conventional land, sea, and air forces, both tactical and interceptor air defense.” For
example, the ratio of tank and motorized divisions to infantry divisions increased.
Moreover, numbers of tactical aircraft, according to US estimates, were thought to have
been reduced from 10,000 aircraft in the mid-fifties to around 4,000 in the early 1960s, of
which only 1,200 were considered to be located in East Germany and Poland.\footnote{Wolfe, 169}
As the number of Soviet troops in Eastern Europe decreased, the Warsaw Pact developed into a
genuine alliance in the early 1960s partly because of these changes in Soviet military
document. According to The Military Balance, “large reductions in the Soviet Army at that
time enhanced the importance of the East European forces for theatre operations.”\footnote{The Military Balance 1966-1967, 1}
In 1963, there were 980,000 men-at-arms from other Warsaw Pact member-states.\footnote{The Military Balance 1963-1964, 11}
In order to take advantage of any gains during a nuclear attack, the mobility of Soviet forces was also increased. There were more armored personnel carriers and tanks in proportion to manpower. A motorized rifle division had approximately 210 medium tanks with 300-400 armored personnel carriers while a tank division consisted of 375 medium and heavy tanks with 300-400 armored personnel carriers. Further, the T-62, which was the first tank with a smoothbore gun, allowing for a greater degree of armor penetration than tanks with rifled barrels, gradually replaced the T-54 beginning in 1963. The overall trend of this period was to increase firepower while reducing manpower. Indeed, according to Marshal Malinovsky, the defense minister of the Soviet Union from 1957 to 1967, a typical rifle division during this period had four times the firepower of an equivalent unit during the Second World War. The size of the army was reduced as a result of significant qualitative improvements and in light of the new nature of battle once theater nuclear weapons were introduced.

Given the availability of tactical nuclear weapons to Soviet forces stationed in Europe, it may seem in hindsight that troop levels were kept at an even higher level than may seem necessary. However, large conventional force size had an important purpose in traditional Soviet military doctrine. As the Soviet Union was undoubtedly inferior to the United States in strategic delivery forces, a strong posture in Europe could provide for a stronger deterrent against any threat of attack from the United States. According to Thomas Wolfe, “a Soviet Union inferior to the United States in global strategic power had to make doubly sure that her military posture against Europe would be taken

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110 Wolfe, 175
111 Wolfe, 174
112 The BDM Corp. *Net Assessment of the Maturing Soviet Threat in Ground Forces*, 4
seriously.” And, a large force stationed in Eastern Europe equipped with nuclear weapons would help keep West Germany in check.

**A Shift to from a Quantitative to a Qualitative Arms Race: Huntington Confirmed**

As this brief overview of the force structure of the United States, the Soviet Union, and their allies during 1955-1965 demonstrates, once tactical nuclear weapons became a feasible alternative to conventional armies through rapid technological advancements, they became the “decisive force” of the arms race in Central Europe upon which the arms competition was centered. Because of the importance of tactical nuclear weapons, this period saw remarkable changes to the force structures and military doctrines of the United States, the Soviet Union, and their respective allies. As Huntington affirms in his theory, nations involved in a quantitative race can shift to an arms race based on qualitative improvements when technology provides for a new decisive force. Once a shift to a qualitative arms race had occurred in the mid 1950s, the arms competition began to revolve with increasing frequency around the qualitative improvements of tactical nuclear weapons.

Moreover, Huntington reminds us that qualitative arms races are generally preferred by the power that is trailing in the quantitative arms race, since it takes fewer resources to shift the decisive force in a conflict. And indeed, the power trailing in the quantitative arms race—the United States—was the first to introduce tactical nuclear weapons into Europe. Early on, the United States abandoned hope of reaching conventional force parity with the Soviets, and instead began to rely heavily on nuclear weapons and its technological edge when compared to the Soviet Union.

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113 Wolfe, 155
114 Ibid, 155
In arms races, the side perceived to have superior forces is usually resistant to change. Khrushchev, possessing a superior conventional force, faced fierce resistance from the military establishment in introducing nuclear weapons at the expense of conventional forces. Khrushchev, correctly assessing the monumental shift in technology that was occurring, eventually got his way and was able to reduce conventional forces for the first time since the end of the Second World War. It was partly because of this resistance to change that tactical nuclear weapons were introduced into Europe by the Soviets at a much slower pace than the US, but once their utility became obvious, this pace quickened substantially in later decades.
Chapter III: 1965-75

**US and NATO forces: An Initial Slowdown**

The United States, deeply involved in Vietnam, sought stability in Europe and a cool-down in the arms race. Spurred on by budgetary pressures and political impetus, the United States withdrew 35,000 troops and four fighter squadrons from West Germany in early 1968. Total armed forces declined from a peak of 3.5 million men-at-arms in 1968 to 2.5 million soldiers in 1972. The technology arms race, which had seen a rapid expansion in the previous decade, was slowing. As of the late 1960s, there had been no new US weapon “for which a decision to produce was made after 1960.”

This is not to say that the strategic position of the United States in Europe was inferior to the Soviet Union. By 1970, the European Command of NATO had roughly 7,000 tactical nuclear devices in its area, with 2,250 delivery vehicles—aircraft, missiles, and artillery. These figures were more or less what they had been in 1965. While delivery vehicles were shared between NATO member-states, all tactical nuclear weapons were under the control of the United States.

Most qualitative improvements in missile technology and delivery methods kept pace with the natural cycle of armament improvement and did not reflect an increase in the intensity of the arms race. The Pershing-IA, a modified Pershing-I MRBM that had variable range, increased mobility, and more flexibility in launch-sites was introduced in 1969. The Lance missile deployed to Europe in US, British, Belgian, Dutch, and

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115 Wolfe, 463
116 The Military Balance 1971-1972, 2
German forces beginning in 1973 as a replacement to Honest John. It was powered by storable liquid fuel, which meant it was more reliable and had shorter launch times than Honest John.\textsuperscript{120} The F-4 and F-111 were both nuclear capable aircraft and were able to deliver four different nuclear weapons, while the British possessed the Vulcan, Buccaneer, and Jaguar to deliver its own nuclear weapons.\textsuperscript{121} Six hundred nuclear capable weapons systems were kept by the West German armed forces alone. Of the nuclear weapons NATO possessed, 21\% were defensive, such as nuclear mines. Offensive nuclear weapons were equally split among the three types of tactical nuclear weapons—35\% were air-delivered bombs, 31\% surface-to-surface missiles, and 34\% were atomic artillery shells.\textsuperscript{122}

\textbf{Soviet Theater Forces in Europe and the Warsaw Pact}

After the fall of Khrushchev and the rise of the Brezhnev-Kosygin regime, the Soviets too, slowed the pace of the theater-level quantitative and qualitative arms-buildup in Europe. The role of Soviet ground forces in Eastern Europe was deemphasized; in fact, they reached their lowest point in 1965. The balance of power in Europe, with the exception of the brief invasion of Czechoslovakia in 1968, initially remained more or less static.

However, while slowing the pace of the arms-buildup in Europe, the Brezhnev-Kosygin regime initiated a strategic arms-buildup, which would later prove to have consequences at the theater level of nuclear armament. The Brezhnev regime increased allocations to the military budget in order to increase the Soviet Union’s global standing and strategic posture. The military budget of the Soviet Union increased from 12.8bn

\begin{footnotesize}
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\item \textsuperscript{120} Karber et al, “Trends in the Deployment of Nuclear Weapons in Central Europe: 1948-1988”
\item \textsuperscript{121} Daalder, 108
\item \textsuperscript{122} Ibid, 109
\end{itemize}
\end{footnotesize}
rubles in 1965 to 17.9bn rubles in 1970—an increase of nearly 40%. Of course, this figure does not include procurements not directly included in the military budget, such as anything remotely involved in the space program, and hence a significant portion of ICBM development. The true Soviet military budget was considerably larger.\textsuperscript{123} Given more budgetary support, the deployment of ICBMs in the Soviet Union was accelerated. Between October 1966 and October 1967 the number of operational ICBMs increased from 340 to 720. By 1970, there were nearly 1,300 operational ICBMs. Qualitative advancements, such as improvements in accuracy and solid-fuel were seen in Soviet ICBMs at this point in time.\textsuperscript{124}

This strategic arms-buildup did not initially affect the European theater. Troop levels remained at around 2 million men, with the same degree of divisional combat readiness.\textsuperscript{125} There were twenty-six Soviet divisions in Eastern Europe, which was exactly the same as in the Khrushchev era. Twenty of these divisions were placed in Eastern Germany, with the rest in Poland and Hungary. A further 25 divisions in the Soviet Union could be quickly moved to the front in case of conflict. Roughly 700 MRBMs and intermediate-range ballistic missiles (IRBMs) were deployed against Europe, which remained constant from the Khrushchev era.\textsuperscript{126}

There were a few relatively minor qualitative improvements to Soviet forces in Europe that deserve mention. Ground forces were given more artillery to increase firepower. Other advancements included “the incorporation of a motorized rifle division in tank armies; the further introduction of new equipment such as the T-62 tank, mobile

\textsuperscript{123} The Military Balance 1970-1971
\textsuperscript{124} Wolfe, 433
\textsuperscript{125} Ibid, 466
\textsuperscript{126} The Military Balance 1967-1968, 6
anti-aircraft weapons, and modified tactical missile and rocket launchers; the increased application of cross-country fuel supply techniques; and attempts to improve command and control through wider automation.”  

Older aircraft were being replaced by the Su-7 and MiG-21 fighter-bombers. The Soviet Union increased military ties with its East European satellite States in order to strengthen the military capabilities of the Warsaw Pact.  

Soviet policy towards the Warsaw Pact remained more or less unchanged since its inception in 1955: it was meant to strengthen its military posture against NATO and to promote political cohesion among Soviet satellite states. The Brezhnev regime initially made progress updating Warsaw Pact forces, so that they would effectively carry out their greater theater responsibilities. Further, the Soviet Union aimed to better incorporate allied forces into Soviet operational plans, notably by increasing the number of joint Warsaw Pact exercises. For instance, in 1961 and 1962 there were just five joint exercises. In contrast, between 1967-68, there were ten joint Warsaw Pact exercises. These exercises were most frequently located in the “Northern Tier”—East Germany and Poland—and this trend became even more pronounced during the early Brezhnev years. 

The trend toward quantitative stability, in a continuation of Khrushchev era policies, was briefly altered as a result of the increasing instability and ensuing invasion of Czechoslovakia in 1968. Before the invasion, the overall number of soldiers in East Europe stood at 850,000 to 900,000. Of these, 600,000 were from the three Northern Tier

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128 Wolfe, 459
129 Ibid, 477-480
countries. Immediately preceding the invasion of Czechoslovakia there was a rapid build-up of troops. In fact, there were more Soviet troops in Central Europe than at any other time since the immediate aftermath of the Second World War. Between 400,000 and 500,000 Soviet troops, with a few East German and Polish divisions, as well as small contributions from Hungary and Bulgaria, participated in the invasion. This is an incredibly large invasion force, and is not very much smaller than a full-on invasion of Western Germany would have been. By all accounts the invasion was impressive by Western standards, as Prague fell within four hours of the invasion through a well-coordinated airborne invasion force. Between 60,000 to 100,000 troops remained, in 4 or 5 divisions, as an occupying force. Ultimately, this occupying force did not alter the conventional balance of power between the Warsaw Pact and NATO. However, it is important to note that while the quantity of troops was not significantly altered at this time, the proportion of combat-ready divisions in the Warsaw Pact was increased. In 1964, roughly half of forces in East Europe were combat-ready, while in 1968 the proportion of combat-ready troops had increased to roughly two-thirds.

In March 1971 Brezhnev announced that it was in the interest of the USSR to reduce the level of armed forces and armament in Central Europe. According to Brezhnev, the strategic situation had shifted to the favor of the Soviets, arguing that the United States was suffering from the “the negative economic and political consequences

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130 The Military Balance, 1967-1968, 6-9
132 Wolfe, 469
133 Ibid, 476
134 Ibid, 485
of an unrestrained arms race.”¹³⁶ In what would have been unthinkable in years past, the Soviet Union and Washington began to consider strategic arms limitations.

**SALT, Détente, and the Strategic Balance**

By the late 1960s, it was clear that a strategic “band of parity” between the United States and the Soviet Union had been reached. While US strategic weapons were held constant, Soviet forces rapidly increased in both numbers and sophistication. In mid-1965, the Soviet Union possessed 224 ICBMs. This figure rose to 1190 by the end of 1969, and 1,618 by 1972.¹³⁷

In 1969, the USSR and the US were beginning to engage in strategic arms limitations talks (SALT), which would ultimately affect the arms race in Central Europe. It was hoped by both sides that these talks would halt or significantly slow the strategic arms race. Further, it was hoped that a respite to the arms race could lead to a détente between the two powers.¹³⁸ In the first phase of SALT, President Nixon and Party Chairman Brezhnev signed a treaty and an executive agreement in 1972. The ABM Treaty banned anti-ballistic missile systems outside of the allowance of two ABM sites per country. In the face of thousands of offensive nuclear weapons, these defenses were practically useless. This ensured that the each nation’s second-strike capability would be viable. The executive agreement, which was to last for five years, froze the number of land-based ICBMs and restricted the size of missile silos—1,053 ICBMs for the United States and 1,618 ICBMs for the Soviet Union. The agreement also capped the number of sea-launched ballistic missiles (SLBMs) and missile launching submarines—710 SLBMs

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¹³⁶ Haslam, 54
¹³⁷ Ibid, 17
for the United States and 950 SLBMS for the Soviet Union, to be placed on a maximum of 44 or 63 submarines, respectively. The fact that the United States was willing to accept lower quantities of weapons than the Soviet Union suggests that the United States both relied to some degree on Western European allies, such as the United Kingdom and France, to make up for the difference. Moreover, the United States most likely believed its strategic forces to be qualitatively superior.

SALT II negotiations were meant to further cool the strategic arms race and widen the range of quantitative and qualitative weapons limitations made under the SALT I Interim Agreement of 1972. The introduction of multiple independent re-entry vehicle (MIRV) technology greatly reduced the importance of SALT I agreements, as multiple, independently targeted warheads could be placed on a single missile, thereby making limits on the number of delivery vehicles obsolete. So, in November 1974 both sides agreed to have an equal “level of launchers, including heavy bombers, and an equal sub-ceiling on MIRVed missiles.” There was a ceiling of 2,400 on launchers, including heavy bombers, and 1,320 on MIRVed delivery vehicles until 31 December 1985.

Technological advancements, by both the Soviet and the US, seriously damaged SALT and hopes for détente. Although systems that were not considered to have intercontinental range were to be excluded from any agreements, U.S. cruise missiles, the Soviet "Backfire" bomber, and the SS-20 posed significant problems to smooth negotiations. U.S. cruise missiles, depending on their mission, could be considered strategic or tactical. The Tupolev Tu-22M Backfire medium-range bomber, if refueled, had intercontinental range. The Backfire offered significant improvement over its

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139 Haslam, 57
predecessor and along with the SS-20, altered the balance of power in Europe. It could fly low and fast, evading radar. It was meant to attack US or NATO carrier battle groups in order to isolate NATO European theater forces from naval logistical support.\(^{141}\) However, relatively small numbers were deployed in theater combat zones.\(^{142}\) The United States and the Soviet Union eventually agreed, in 1976, that the Soviet Union would slow down the production of Backfire bombers, while the United States would not test cruise missiles with a range over 2,500 miles and not deploy any SLCMs or GLCMs with a range over 600 miles.\(^{143}\) The SS-20, which could carry three nuclear warheads, had a range of 5,500 kilometers, which was just under the threshold allowed in SALT I. Moreover, the SS-20 was essentially a truncated SS-16, which was an ICBM. This gave the Soviets huge “breakout” potential if they wished to rapidly increase the size of their strategic forces.\(^{144}\)

*A Changing Balance and the US Response*

In the early 1970s the United States and NATO, because of significant Soviet weapons deployments, became concerned that flexible response was no longer credible. Flexible response was created during the Kennedy administration, at a time when the United States had unquestioned superiority in tactical and strategic nuclear weapons, which it could rely on instead of conventional forces. As the Soviet Union achieved strategic parity, however, this strategy became questionable, as the United States may not have been truly willing to risk an attack on its own cities in order to defend Europe.

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\(^{142}\) Haslam, 61. There were 25 Tu-22M Backfire bombers deployed in 1975, 30 in 1976, and 35 in 1977.

\(^{143}\) Daalder, 164

\(^{144}\) Ibid, 163
Therefore, the United States would have to renew efforts to improve conventional and theater nuclear forces for the defense of Europe.\textsuperscript{145}

Military trends during this period point to marked Soviet advancements in quality of their conventional forces. The Soviets, in this time period, increased the rate of force modernization. With the end of Khrushchev’s term in 1964 and the Soviet debate on how to respond to the “flexible response” doctrine, Soviet conventional forces once again increased. The USSR was moving away from a nuclear-only approach to war and began to prepare for limited war. Division numbers climbed from 139 in 1965 to 168 by 1975, while Soviet manpower nearly doubled.\textsuperscript{146} Moreover, the Soviet military was beginning to rethink its tactics for an attack on Western Europe. A rapid thrust into allied territory, thereby intermingling Warsaw Pact and NATO forces would make a tactical nuclear response by NATO difficult without endangering the lives of its own troops.\textsuperscript{147}

The 1977 \textit{US Defense Perspectives Report} was concerned about the renewed and rapid pace of Soviet weapons development during the period from 1965 to 1975. For one, Soviet force procurements mirrored a military doctrine that espoused a “blitzkrieg-type” war in Central Europe. Major improvements in ground-based air defense freed up a larger percentage on their air forces to engage in offensive operations.\textsuperscript{148} As of the mid 1960s, there was a general shift in qualitative advancement from gun to missile technology. The rate of introduction of Soviet antitank guns had largely been replaced by an emphasis on antitank missiles, while surface-to-air missiles had replaced air defense guns.\textsuperscript{149} Soviet divisions were equipped with up to five different surface-to-air gun and missile systems,

\begin{footnotes}
\item[145] Daalder, 128
\item[146] The BDM Corp. \textit{Net Assessment of the Maturing Soviet Threat in Ground Forces}, ch. I
\item[147] Haslam, 52
\item[149] The BDM Corp. \textit{Net Assessment of the Maturing Soviet Threat in Ground Forces}, ch. II
\end{footnotes}
each with overlapping capabilities.\textsuperscript{150} In the period from 1971 to 1975, it was estimated that the Soviet Union was out producing the United States in tanks by a factor of 7.3:1, 2.5:1 in armored personnel carriers (APCs), and 5:1 in conventional artillery.\textsuperscript{151}

The Soviets achieved parity and even superiority in main battle tanks by the early 1970s. The T-72 had a number of advantages over its US/NATO counterpart, the M-60A2. It had a higher velocity gun and an automatic loader, which reduced weight and allowed for more armoring.\textsuperscript{152} The 1973 Yom Kippur War provided a clear indication of the sophistication of Soviet conventional military armaments when in combat with US supplied forces. The Egyptians used Soviet-make anti-tank missiles to great effect in repelling an Israeli counter-attack. They were equipped with RPG-7 antitank rifles and AT-3 Sagger antitank guided missiles.\textsuperscript{153} Although the Israelis won largely to superior training, the Soviet-made equipment, which greatly increased the firepower of the Egyptian and Syrian forces, allowed for a close match.\textsuperscript{154} Overall from 1965 to 1975, Soviet equipment inventories saw a 33% increase in tanks to 200% increase in surface-to-surface missiles.\textsuperscript{155}

\textit{From Détente to Breakout: Huntington Challenged}

There are a number of important developments from 1965 to 1975 with regards to Huntington’s arms race theory. There is indeed, as Huntington predicts, a period of stabilization following the qualitative arms race seen from 1955 to 1965. This is demonstrated by the fact that the Soviet Union, the United States, and their allies all had

\begin{footnotesize}
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\item\textsuperscript{150} Rumsfeld, 16
\item\textsuperscript{151} Ibid, 18
\item\textsuperscript{152} The BDM Corp. \textit{The Net Assessment of the Maturing in Soviet Threat in Ground Forces}, 7
\item\textsuperscript{153} van Creveld, Martin. \textit{Military Lessons of the Yom Kippur War: Historical Perspectives}. (Washington: Center for Strategic and International Studies, 1975), 14
\item\textsuperscript{154} Ibid, 15
\item\textsuperscript{155} The BDM Corp. \textit{The Net Assessment of the Maturing in Soviet Threat in Ground Forces}, 8
\end{itemize}
\end{footnotesize}
relatively static force positions in Europe in the late 1960s. However, there was a significant expansion of Soviet military capability, and an ensuing destabilization of the larger arms race, in the early 1970s during and after SALT. With the stabilization of the strategic race, at first glance, it would make little sense to Huntington that the number of Soviet divisions increased from 139 in 1965 to 168 in 1975, while manpower increased by 70%, from 1.7 to 2.9 million in the same stretch of time.\textsuperscript{156}

There are various reasons that would explain this anomaly in Huntington’s theory. The first explanation is based on a Soviet re-appraisal in military strategy as a result of changing technology. A Soviet build-up may have been in response to NATO’s “flexible response” doctrine. More planners within the Soviet military establishment began to reconsider their rigid nuclear strategy, and many believed that Soviet conventional forces should be prepared to repel any purely conventional attack without resorting to nuclear weapons.\textsuperscript{157} This change in strategy required an increase in the size of conventional forces.

While this partly answers why Huntington was wrong to believe that an arms race that has stabilized will remain so, it neglects the concurrent increase in Soviet theater nuclear technology. It is possible that the balance of power at the strategic nuclear level can cause shifts in competition to lower armament levels. This would be analogous to a quantitative arms control agreement shifting an arms race towards qualitative competition. In this particular case, Soviet parity at the strategic level, which was firmly secured in international law by SALT, led them to pursue advantages in the military balance at the theater nuclear level. The Backfire bomber and the SS-20 were not covered

\textsuperscript{156} The BDM Corp. \textit{The Net Assessment of the Maturing in Soviet Threat in Ground Forces}, 7
\textsuperscript{157} Wolfe, 211
by the SALT agreements, and offered powerful challenges to the balance of power. Once these forces had been introduced, the response of NATO and the US to potential Soviet aggression was to be proportionate to the threat at hand. And, once the arms race was re-ignited in the early 1970s, it became terribly difficult to stabilize.
Chapter IV: 1975-85

The United States and NATO: Answering the Soviet Breakout

Incremental US reductions in troop levels, when viewed over the span of decades, represented dramatic force reductions. In 1962, just before the introduction of “flexible response,” total US forces in Europe stood at 434,000. By 1979, US forces had been reduced to 300,000. However, largely in an effort to increase the qualitative capabilities of U.S. forces, the United States defense budget increased notably in the late 1970s and early 1980s. In fact, President Carter initiated the largest military budget build-up in U.S. history up to that point in time, and President Reagan expanded the military budget further still—the nominal defense budget increased by approximately 50% from 1980 to 1985.

Many in the West in the late 1970s, alarmed at Soviet weapons improvements, believed that NATO nuclear forces were not sufficiently modernized. Modern nuclear forces were needed both to increase survivability, and to “enhance and maintain the deterrent and war termination capabilities” of NATO. The United States’ previously unchallenged strategic superiority had according to Christoph Bertram, “provided regional deterrence for America's allies as well.” Once the United States’ own deterrence had been challenged by strategic parity with the Soviet Union, its extended deterrence in Europe was challenged as well. In order to regain this deterrent capacity,

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160 Haslam, 63. Quote by Secretary of Defense Richard Schlesinger.
the US needed to enhance its credibility through the introduction of new weapons systems that could survive and be operational after a Soviet first-strike. As a result, a number of important weapons systems that attempted to place US qualitative superiority beyond doubt were introduced during this period.

The Pershing-II was a replacement for the Pershing-IA in Europe. In 1980, NATO and US decided to install 108 Pershing IIs and 464 cruise missiles in Western Europe in response to the deployment of the SS-20. The Pershing II was an extremely potent response to the SS-20. These weapons were meant to be less vulnerable to a first-strike attack by the Soviets, which added to the credibility of extended deterrence and made it less likely that a Soviet first-strike would necessarily escalate into a full-blown nuclear confrontation. Through advanced radar mapping technology, it had a very low CEP of 50 meters and could therefore have a much lower yield while having the same destructive force on an intended target. Its speed of mach 8 meant that it could reach targets in Eastern Europe or the Soviet Union much faster than its predecessors.

Sea-launched cruise missiles (SLCMs) and ground-launched cruise missiles (GLCMs) enabled the United States to carry out high-accuracy, conventional or low yield nuclear attacks on Warsaw Pact military installations. GLCMs travel at sub-sonic speeds and are therefore more vulnerable to enemy fire, although they are harder to detect with a radar cross-section that is much smaller than a missile. The introduction of cruise missiles to the European theater was potentially devastating for the Warsaw Pact. It had been estimated by the Pentagon that conventional armed cruise missiles could knockout

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162 Daalder, 144
163 Judt, 590
164 Bertram, Christoph. “Nuclear Weapons in the 1980s”
166 Weinrod, Bruce, ed. Arms Control Handbook. (Washington: The Heritage Foundation, 1987), 51
75% of all airfields, bridges, supply depots, and other infrastructure necessary for the Warsaw Pact and Soviet Union to sustain an offensive attack in Europe.\textsuperscript{167} Because of its high accuracy, it was considered to be a “first-strike” weapon by the Soviet Union. The Pershing IIs and cruise missiles began to be deployed in 1983 after INF negotiations had come to a standstill, with full deployment by 1988.\textsuperscript{168}

The introduction of Pershing IIs and cruise missiles, regardless of their capabilities, accounted for a fraction of total nuclear forces in the region. Short-range nuclear weapons, such as nuclear artillery, still accounted for almost two-thirds of the US nuclear forces in the European theater. In other developments, deployment of the Lance missiles and launcher was completed in 1976.\textsuperscript{169} At the same time, an eight-inch artillery fired atomic projectile (AFAP) was being developed, which would have a lower yield but increased accuracy in combat. While this program was continued by the Reagan administration, production of enhanced radiation “neutron” warheads for the Lance and 8-inch artillery was also given the green light.\textsuperscript{170} Neutron weapons were designed to cause increased harm to mobile units while having lower yields than traditional nuclear warheads.

The early Reagan Administration, while upgrading nuclear forces, placed more emphasis on funding conventional forces. The M-1 Abrams tank was in full production by 1983.\textsuperscript{171} The US began to deploy the F-15 fighter jet in increasing numbers in the early 1980s, resulting in a higher number of combat-ready aircraft in Central Europe.\textsuperscript{172}

\textsuperscript{167} Haslam, 67
\textsuperscript{168} Weinrod, 51
\textsuperscript{169} Daalder, 143
\textsuperscript{170} Ibid, 239
\textsuperscript{172} Ibid, 4
The F-16 was a highly maneuverable aircraft that was capable of carrying from two to six Mk 82 nuclear bombs. It entered service in 1982, with 42 being introduced to Central Europe. In 1987, a total of 72 were based in Europe. The Dutch and Belgians deployed 54 F-16s in the mid 1980s.\textsuperscript{174}

![Graph showing quantities of key conventional active forces in NATO guidelines area.](image)

**Figure 1. Quantities of key conventional active forces in NATO guidelines area.** The changes in NATO and Warsaw Pact (WTO) main battle tanks (MBTs), light tanks, anti-tank guns, and anti-tank missiles (ATGMs) are represented here. As part of the qualitative force improvements in the early 1980s, ATGMs represent a much larger part of the NATO force structure by replacing anti-tank guns. The Warsaw Pact, on the other hand, begins to lower the rate of introduction of MBTs after the late 1970 “breakout.”\textsuperscript{173}

NATO and the United States began development on a wide range of conventional weapons systems in order to minimize the Soviet advantage in main battle tanks, which would constitute the knife-edge of any Soviet invasion. Precision guided shells for artillery pieces offered an improved anti-tank ability. Significant numbers of TOW and

\textsuperscript{173} Karber, Phillip, “In Defense of Forward Defense.” *Armed Forces Journal* (May 1984), 27-50

“Dragon” anti-tank guided missiles (ATGMs) were introduced into Europe as a counter to improved Soviet tank forces (Figure 1).\textsuperscript{175} Moreover, the total number of tanks in NATO (in all member states, including reserves) during this period was increased. In 1975 NATO had around one-third as many operational tanks as the Warsaw Pact. NATO more than doubled the total number of tanks in Central Europe, so that by 1983 the ratio of NATO to Warsaw Pact tanks in this area was reduced to 1:1.55.\textsuperscript{176}

\textit{The Soviet Union and the Warsaw Pact: A Continuing Arms Buildup}

The mid-1970s were years of relative strength for the Soviet Union. The United States had just ended a long and bloody war in Vietnam, and US public opinion was firmly against war. The Soviet Union, on the other hand, was pleased with the Communist takeover of Southeast Asia and in Angola. The formal period of détente sputtered on until the Soviet invasion of Afghanistan in 1979, but was essentially over if one considers the rapid developments in Soviet nuclear technology and growth of conventional forces. And, while the United States and NATO had been enhancing the quality of their forces in Europe to offset Soviet numerical and technological advances, the Soviet Union and the Warsaw Pact had been modernizing at the same rate or even faster, while simultaneously expanding into new fields.

While the Soviets had dropped their insistence that forward US bases be reduced in Europe during the Vladivostok summit in 1974, Brezhnev decided to resume the development of weapons that would prove to significantly alter the balance of power in

\textsuperscript{175} The Military Balance 1975-1976, 4
\textsuperscript{176} The Military Balance 1982-1983, 133. The discrepancy between The Military Balance ratio and the preceding graph is due to the geographical area in which MBTs are counted. The Military Balance includes the tanks of all NATO forces in Europe, while the preceding graph was created using the number of tanks located in the NATO guidelines area (West Germany, Denmark, Belgium, the Netherlands, and Luxembourg).
Europe. This was done in part to provide more leverage for a possible SALT III talks. The SS-20, first deployed in 1977, was developed as a highly mobile missile that would be able to survive a US counterforce attack. Mobile SS-20s were much less vulnerable than fixed-site SS-5 and SS-4 IRBMs. As every SS-20 could carry three warheads, the number of Soviet theater nuclear warheads more than doubled, going from 570 to 1,362 over the eight years from 1977 to 1985.

In 1975, the Soviets introduced their first deployable nuclear artillery pieces, which were more or less modifications of extant conventional artillery pieces. The 240mm M-1975 SP mortar was deployed on the 2S4 Tyulpan vehicle and was a modified version of an earlier conventional mortar. The 1975 version had a longer range of 9,700 to 12,000 meters, which was necessary for infantry survivability after nuclear attack. With a crew of four, the vehicle could park, anchor, and fire in under five minutes. The 2S7 203mm Towed/SP gun was also introduced in 1975, and like the 240mm SP mortar, was assigned to units expected to be at the vanguard of an invasion of Central Europe. The 2S3, M-1976, and 2S5 were introduced in 1973, 1975, and 1976, respectively. They were all nuclear capable and were designed to be operated further away from the front in

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177 Haslam, 61
180 Ibid, 29
The Warsaw Pact did not deploy nuclear artillery until 1975 for a number of reasons, despite the fact that the Soviet military possessed militarization technology since the 1960s. First, the caliber of Soviet Artillery (122mm) was smaller than NATO artillery, making the miniaturization problem more difficult. Second, all Soviet artillery had been towed, and having mobile nuclear artillery would have necessitated more expenditures. Finally, nuclear artillery is a relatively inefficient use of nuclear material.

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182 Ibid, 30
so perhaps the Soviets preferred to build up a sufficient stock of larger, strategic nuclear weapons first.\(^{184}\)

In any case, once the Soviet military decided to build nuclear artillery, these were built at a prodigious rate, increasing in number from 150 to 1,452 in the 1975-85 decade (). Since nuclear warheads produced for artillery are small, they have much lower yields than other theater nuclear forces. Nuclear artillery can be considered to inherently favor offensive use. This is because defending infantry units are more likely to be static and are therefore more vulnerable to nuclear artillery strikes than fast-moving offensive armor.\(^{185}\)

The Soviets introduced SS-21 and SS-23 short-range missiles into Czechoslovakia and East Germany in late 1983 as a response to the Pershing II and GLCM deployments by the United States. These missile systems replaced the unguided rockets and older unguided missile models. The SS-21 and SS-23 had longer ranges than their predecessors (900 and 500 kilometers, respectively) and were more accurate.\(^{186}\) It has been estimated that the Soviet Union had approximately 80 SS-12/22s and 60 SS-23s deployed within range of NATO targets.\(^{187}\) If deployed near NATO installations these weapons could be considered as potent as the SS-20 due to their high accuracy.\(^{188}\)

The Soviets made impressive improvements to their aerial nuclear capabilities as well. The older “Bear” and “Bison” long-range bombers were being put in reserve while the “Backfire” was being deployed in increasing numbers. The MiG-21, Su-7, and Su-17 tactical aircraft were being phased out.\(^{189}\) Instead, the MiG-27 “Flogger” was deployed in

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\(^{184}\) Ibid, 17
\(^{185}\) Karber, Phillip. “NATO’s Antitank Crisis” Armed Forces Journal International (June 1987), 121
\(^{186}\) Lee, 131
\(^{187}\) Weinrod, 52
\(^{188}\) Ibid, 52
\(^{189}\) The Military Balance, 1983-84, 12
Central Europe beginning in 1975. By 1978, there were 135 MiG-27s in Central Europe, which was up from 34 in 1975. These Soviet aircraft had sophisticated radar and were modified for ground attack roles.\textsuperscript{190} The SU-24 “Fencer,” which was introduced in significant numbers to Central Europe in 1979, was a formidable nuclear strike aircraft, and a replacement to the Il-28 and Yak-28 light bombers. The number of SU-24s in Europe rose rapidly, from 90 in 1980 to 135 by 1982. In 1984, their numbers reached a plateau of 270.\textsuperscript{191} The Su-25 “Frogfoot” and the MiG-31 “Foxhound” were both introduced in 1982.

In the overall balance of nuclear theater forces as of 1984, it was estimated that the Warsaw Pact advantage in arriving nuclear warheads, that is, warheads that would hit their intended targets—was 3.6:1 if US Poseidon and Trident missiles were not included in the balance. If they were included, this ratio fell to 1.7:1. Generally, the Soviet Union relied much more on missile systems than the United States.\textsuperscript{192}

A 1976 Congressional Report on the US-Soviet military balance raised concerns that the quantitative military balance, since 1965, had shifted in favor of the Soviet Union. The Soviets held numerical superiority in every category of strategic weapon, except for MIRVs.\textsuperscript{193} Tactically, the Soviets had a clear quantitative superiority on the European continent, where they had a 10:1 superiority in surface-to-surface missiles and a 2:1 advantage in nuclear capable aircraft, of which there were roughly 700. The conventional force balance stood at a ratio of 2.5:1. In fact, the US had only two quantitative advantages: the Marine Corps was much larger than the Soviet equivalent

\textsuperscript{190} Karber et al., “Trends in the Deployment of Nuclear Weapons in Central Europe: 1948-1988”, 89
\textsuperscript{191} Ibid, 90
\textsuperscript{192} The Military Balance, 1983-84, 135
\textsuperscript{193} Collins, John. United States/Soviet Military Balance: A Frame Reference for Congress, 4
and the United States had more helicopters.\textsuperscript{194} Increases in force size had added another six Soviet divisions in Eastern Europe by the end of the 1970s.\textsuperscript{195} The number of tanks in divisions increased from 316 to 335. Rifle divisions were 266 in number.\textsuperscript{196} Along the Czechoslovakian and East German borders, where threat of attack was highest, the disparity between US and Soviet forces was even greater. There were approximately 195,000 US troops with 2,500 tanks, while the Soviets had 250,000 troops with 7,000 tanks.\textsuperscript{197} The total number of motorized rifle divisions increased from 119 to 126 in this period, with a few extra going to the European theater.\textsuperscript{198}

The Soviet Union made significant qualitative improvements to its conventional forces as well. In 1978 a major reorganization of the military began, with the intent to improve the mobility and firepower of Soviet units.\textsuperscript{199} In surface-to-air missiles, certain armored vehicles, and artillery, Soviet forces could be considered to have superior equipment.\textsuperscript{200} The Soviet Union introduced three new types of helicopter in the early 1980s, in order to fulfill ground attack, air superiority, and transport roles.\textsuperscript{201} One helicopter regiment had been introduced to each Soviet Army in East Germany.\textsuperscript{202} The T-80 tank was introduced into the European theater in the mid-1980s. The T-80 and late

\textsuperscript{194} Ibid, 5. NB: The respective amphibious assault forces of the United States and the Soviet Union stood at 197,000 and 12,000.
\textsuperscript{195} The Military Balance 1978-79, 112
\textsuperscript{197} Collins, United States/Soviet Military Balance: A Frame Reference for Congress, 8
\textsuperscript{198} The Military Balance 1983-1984, 11
\textsuperscript{199} Hansen, 113
\textsuperscript{200} The Military Balance 1978-1979, 112
\textsuperscript{201} Lee, 131
\textsuperscript{202} The Military Balance 1983-1984, 11
model T-64 were able to fire anti-tank missiles through their main guns, in yet another qualitative improvement.\textsuperscript{203}

In the mid 1980s, the Soviet Union developed reactive armor for the T-80 tanks, and this seriously undermined the utility of NATO anti-tank weapons that relied on using a shaped detonation to puncture the side of a tank. In the period between 1986 and 1987, roughly 75-80\% of tanks in East Germany now had reactive armor.\textsuperscript{204} At the time, it was thought that up to 95\% of NATO’s infantry anti-tank capability was compromised.\textsuperscript{205}

\textbf{The Strategic Balance and Attempts at Arms Control}

Both the United States and the Soviet Union had achieved strategic parity by the late 1960s and early 1970s, and these positions had been cemented through the SALT agreements. By the early 1980s, negotiations on arms control began on some theater nuclear weapons systems.

Talks on the limitation of intermediate nuclear forces (INF) began in 1981. The United States wished to halt the deployment of its intermediate range nuclear force in Europe if the Soviet Union would eliminate its SS-4, SS-5, and SS-20 missiles. There were a few disagreements between the two parties. First, the Soviet Union wished that any potential agreement be confined to Europe, whereas the United States wanted a global agreement. Second, the United States only wanted US and Soviet systems to be counted, whereas the Soviets wanted British and French INF systems included. Finally, the Soviets wanted all delivery systems included, while the US was only concerned with

\textsuperscript{203} Lee, 131  
\textsuperscript{204} Karber, “NATO’s Antitank Crisis”, 43  
\textsuperscript{205} Ibid, 48
coming to an agreement on missiles.\textsuperscript{206} During the ensuing deadlock, the United States began deploying cruise missiles and Pershing II missiles to Europe in the face of much Soviet protest.

Regardless of stalling negotiations, the United States had undertaken a policy of modernizing and reducing its nuclear stockpile in Europe, which was made possible through technological advancements that allowed for more accurate nuclear strikes. The planned force improvements had increased range and survivability than their predecessors.\textsuperscript{207} In 1980, NATO had already withdrawn one thousand nuclear weapons from Europe. In 1983, a unilateral decision by the United States reduced its nuclear stockpile in Europe by an additional 1,400. Taken together, this accounted for a reduction of over one-third of NATO’s nuclear stockpile and reduced its stockpile to its lowest level in 20 years.\textsuperscript{208} This represented a sizeable shift in US nuclear policy, as only defensive and short-range nuclear weapons were reduced.

\textit{Quantitative and Qualitative Build-up: Huntington Modified}

It is apparent that the period from 1975-85 saw a return to a quantitative and qualitative build-up on both sides. This concerted and rapid restart to the arms race has seriously challenged Huntington’s assertion that qualitative arms races, once stabilized, rarely increase in intensity. In fact, the opposite was true, since détente and Soviet strategic parity had unsettled the United States’ decade long strategic dominance. As a modification of Huntington’s theory, it is not so much that qualitative parity leads to stability, but rather a long established armament status quo that does. US extended deterrence had been compromised, and as a consequence, US theater and conventional

\textsuperscript{206} Daalder, 248
\textsuperscript{207} Daalder, p. 243
\textsuperscript{208} Ibid, p. 243
forces needed to be augmented to increase credibility. In a vicious cycle, the Soviets also felt a need to both quantitatively and qualitatively improve their theater forces in this reascent arms race.

Other aspects of Huntington’s theory may not be so far off the mark. “Arms Races: Prerequisites and Results” insists that multidimensional arms races are eventually unsustainable due to their enormous costs. Quantitative arms races require a large amount of resources and persistence. If Huntington’s arms race theory is taken to its logical extreme, a state will either give up or decide go to war. Perhaps this renewed arms race was a contributing factor to the dissolution of the Soviet Union, which was to occur in 1991. Although the defense budget of the United States increased substantially during this period, the main focus of the United States was qualitative force improvement. The Soviet Union, on the other hand, attempted to keep and surpass the United States technologically while maintaining unsustainably large numbers of forces. Although the period from 1975 to 1985 presented a serious challenge to the United States militarily, the Soviet Union’s political, economic, and military positions were to rapidly deteriorate.
Chapter V: 1985-95

The United States and NATO

The late 1980s saw dramatic and sudden shifts in the balance of power in Europe and the end of the Cold War. There was continued military modernization, but it was not until 1987-88 that it became clear that the end of the Cold War was imminent. In 1985, US defense spending rose by 6%—an unprecedented peacetime increase.\textsuperscript{209} Military support to Afghanistan and Central America was increased. But spending at this rate was not to last, as continued deficit spending in the late Reagan years and subsequent congressional demands to reduce defense spending led to reductions in real terms from 1986 to 1988.\textsuperscript{210}

Despite budget decreases, US strategic modernization programs continued. Titan ICBMs were taken out of deployment, while 50 Peacekeeper ICBMs were introduced by 1990. Peacekeepers were highly accurate and had the ability to carry 10 MIRVed warheads. These missiles were not allowed under SALT.\textsuperscript{211} B-1 bomber deployment was continuing, while B-52s were being outfitted with the ability to carry air-launched cruise missiles (ALCMs). Moreover, the Reagan administration’s Strategic Defense Initiative “Star Wars” missile defense plan continued to cause great concern within the Soviet military establishment, which believed it was a technology intended to allow for a US first-strike capability.

\textsuperscript{209} Judt, 592
\textsuperscript{211} Judt, 592
A Continued Arms Build-up: the Beginning of the End

The Soviet Union, in 1985, increased its official defense budget by 11%, from 17.05bn rubles ($23.01bn) to 19.06bn rubles ($22.25bn). This was the largest defense increase in 25 years, and the true Soviet defense budget was considered to be at least ten times higher. This increase was portrayed by the Soviet government as a response to increases in US defense spending.

The Soviet Union introduced its reply to the US deployment of cruise missiles into Europe with a version of its own: the SSC-X-4 ground-launched cruise missile. Strategic SLBM and ICBM forces continued to be modernized. There was, however, no change in the IRBM and MRBM inventory, but a 10% increase in the medium-range bomber force due to 20 Tu-26 Backfires, 32 Tu-16 Badgers, and 5 Tu-22 Blinders coming into service.

The quantitative expansion of the Soviet Union during the mid 1980s was impressive. The total number of Soviet troops had risen from 3.56 million in 1980 to 5.11 million by 1984. Moreover, the Soviet Union and the Warsaw Pact had either increased their lead or narrowed the gap in all major ground force equipment types. From 1983 to 1986, the disparity in main battle tanks had risen from 1:1.87 to 1:2.59; in artillery, 1:1.11 to 1:3.24; in SSM launchers, 1:2.39 to 1:4.3 in anti-tank missiles (ATGW), the balance swung from a NATO advantage of 2.78:1 to a Warsaw Pact

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213 Ibid, 17
216 The Military Balance 1985-1986, 170
advantage of 1:2.79. As discussed previously, many of main battle tanks were being equipped with reactive armor, which seriously weakened the efficacy of NATO’s anti-tank weapons.

In the late 1980s, there were no significant increases in ground force size in Warsaw Pact nations, although there had been significant increases in Air Force and Naval quality and size. Czechoslovakia was the first and only Warsaw Pact member to receive the Su-25 “Frogfoot” close support aircraft.

**The INF Treaty and Conventional Force Reductions: The End of the Arms Race**

The late 1980s are most notable for significant arms-control measures for both nuclear weapons and conventional forces. Gorbachev advocated that force levels be at a level of “reasonable sufficiency” instead of strategic parity. This meant that Soviet nuclear and conventional forces could be much lower and still provide for basic deterrence against Western attack. The sudden about-face of Soviet leaders towards force reductions points to their desire to end the arms race in Central Europe and the Cold War.

Following a series of Soviet concessions on intermediate nuclear weapons, the INF treat was signed in 1987. It distinguished itself from other arms-control measures in three ways: the degree of reductions, the rigorous verification, and the disproportionately large reductions to the Soviet arsenal. The fact that the Soviets agreed to even larger reductions than the Americans would suggest that either they considered their military

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218 The Military Balance 1985-1986, 31
220 Ibid, 215
posture even worse-off without an agreement, found intermediate nuclear forces to be too burdensome financially, or that they had radically changed their security requirements.

The INF Treaty called for the elimination of medium and short-range nuclear missiles, and in particular, the SS-20, Pershing II, and ground-launched cruise missiles. The negotiations had originally been centered on intermediate nuclear forces, but the US wanted any agreement on intermediate forces to include caps on shorter-range forces as well, which the Soviet Union initially opposed. It came as a bit of a surprise when Gorbachev suddenly proposed the elimination of both short and long-range INF missiles, without including the nuclear forces of Great Britain and France in any agreement, and the United States readily agreed. Pursuant to the INF Treaty, the last SS-20 missiles were destroyed in 1991. Since 1988, the Soviet Union destroyed a total of 1,766 missiles and 819 launchers.\textsuperscript{221} The United States, for it part, destroyed 288 Pershing II and GLCM launchers, 403 Pershing IA and II missiles, and 443 GLCM.\textsuperscript{222}

The success of the INF Treaty shifted the focus to conventional weapons in Europe. Conventional force reductions were a much more serious matter for the Soviet Union, as it had the preeminent conventional force in Europe. The Soviet Union had traditionally relied on strong conventional forces in its force posture. Once this force posture was considered untenable, the Soviet Union sought to reduce the number of conventional forces in Europe through arms control measures. It was massive troop reductions, and not reductions to nuclear forces, that would provide for the largest cuts in the Soviet military budget.

\textsuperscript{222} Ibid, 13
On December 7, 1988, Gorbachev announced plans at the UN to unilaterally reduce the size of Soviet conventional forces by “500,000 men and to eliminate a total of 10,000 tanks, 8,500 artillery pieces, and 800 combat aircraft” from Eastern Europe, including European Russia, by 1991.” Of this figure, fifty thousand troops and 5,300 tanks were to be withdrawn from non-Soviet Warsaw Pact members. Warsaw Pact members announced their own military reductions. East Germany reduced troop numbers by 10,000 and 600 tanks. The Polish Army reduced forces by 40,000, 850 tanks, 900 artillery and mortar pieces, 700 APCs, and 80 aircraft.

At roughly the same time, the Soviet Union proposed mutual limits on conventional forces in Europe at the CFE talks in Vienna. While “Mutual and Balance Force Reductions” talks had been occurring since 1973, this was the first time the Soviet Union was actually willing to make meaningful reductions. The Soviet Union wanted to limit the number of Soviet forces in Eastern Europe to 350,000, 4,500 tanks, 4,000 artillery and mortar pieces, 7,500 APCs, 350 strike-aircraft, and 600 helicopters.

The Collapse of the Soviet Union and the Warsaw Pact

After the INF treaty, NATO nuclear forces were comprised of nuclear artillery, Lance surface-to-surface missiles, and air-delivered bombs. The only qualitative improvement during the late years of the Cold War was the introduction, in limited numbers, of the M-753 artillery fired atomic projectile. It contained a rocket motor in

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224 Ibid, 43-44
225 Ibid, 30
order to increase range. A replacement to the Lance SSM was planned but never implemented.  

In early 1990 Hungary and Czechoslovakia secured the withdrawal of all Soviet garrisons stationed within their borders, and one year later the Warsaw Pact dissolved as a military organization. Both the United States and the Soviet Union, in late 1991, announced reductions on tactical nuclear weapons. All nuclear artillery and short-range SSM warheads were to be removed from Europe. Because all Russian troops were to be withdrawn from Eastern Europe, there was little strategic need for these weapons. NATO had also unilaterally agreed to reduce the number of nuclear gravity bombs in Europe by 50%.  

By the end of July 1994, all Russian forces had been withdrawn from Germany and re-deployed within Russia. The last vestiges of the Cold War in Central Europe were gone.

**Huntington’s Endgame**

It is ultimately economic considerations that cause nations to abandon arms races, according to Huntington. Of course, the collapse of Soviet military power cannot be entirely attributed to the arms race itself; while the financial costs of maintaining the arms race were enormous, there were many factors that contributed to the decline of the USSR, which will not be discussed here. However, the renewed competition between the United States and the Soviet Union during the late 1970s and 1980s unquestionably exacerbated the already present weaknesses within the Soviet system. The Soviets struggled to keep pace with American advancements without devoting an enormous amount of their national product towards military spending. At their peak, according to Tony Judt,

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226 Ibid, 52
“somewhere between 30-40 percent of Soviet resources were diverted to military spending, four to five times the American share.”

Huntington believed that rising economic costs in an arms race must be relatively equal among their participants or else the other power would not agree to reductions. As this was certainly not the case between the Soviet Union and the United States with regards to the INF and CFE Treaties, it begs the question: why did the United States want to agree to arms control in its position of superiority? Stronger nations can indeed agree to arms limitations, as long as force reductions are disproportionately placed on the weaker nation. In fact, the INF and CFE Treaties demonstrate that the Soviet Union was willing to decrease its nuclear and conventional forces by a much larger amount than the United States—or its allies—ever would. And, in a refutation of Huntington, arms agreements can include weapons that are a decisive force, provided that arms control agreements are in favor of the stronger nation.

As the proportion of military expenditure to total national product increases, a heavier burden is placed on the population to contribute to the arms race. As a result, Huntington explains, it becomes increasingly necessary for governments to stimulate support by increasing fear of the enemy, among other things. The threat of the enemy, and the need to continue the arms race, becomes as much imagined as it does real. Once Gorbachev changed Soviet military policy to the doctrine of reasonable sufficiency, the burdensome requirements to maintain strategic parity—both quantitatively and qualitatively—were no longer needed. As a result, it was impossible to justify the Soviet

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229 Judt, 592
230 Huntington, “Arms Races: Prerequisites and Results,” 407-08
231 Huntington, “Arms Races: Prerequisites and Results,” 406
presence in Eastern Europe and the continuation of the arms race to the Soviet people, those in Eastern Europe, and the international community. Once the Soviet Union lost all military justification for remaining in Eastern Europe, the Soviet Union itself would have to fall, as the arms race and military power represented the glue that held the Soviet Empire together.

Gorbachev, although not anticipating the abrupt collapse of the Soviet Union, largely welcomed arms limitation and an end to the arms race, as they provided a more stable international environment and an ability to focus on domestic reforms.232 Just as war is an extension of politics, so too are arms races: when the worldview of a particular nation is modified due to changing political circumstances, then so can its position on whether to continue or abandon an arms race. In this case, the Soviet Union decided that a massive quantitative and qualitative arms buildup in Central Europe was no longer needed to secure its goals.

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232 Judt, p. 601
Conclusion

Huntington: A Final Appraisal

Overall, three general findings describe the US-Soviet arms race. First, overall numbers of nuclear weapons increased tremendously over the course of the competition. Second, the relative balance shifted away from US nuclear superiority to parity and then eventually to Soviet overall superiority after a number of breakout qualitative and quantitative enhancements (1). Third, conventional weapons in the European theater again gained importance in the arms race once strategic parity had been achieved by the 1970s (Figure 1). Huntington’s arms race framework is a relatively good predictor of behavior until the late 1960s, as the arms race in Central Europe from 1945 to 1965 closely mirrored Huntington’s expectations on the progression of arms races.

The immediate postwar years saw a decrease in the conventional force size of the Soviet Union and the United States. However, as both sides were extremely wary of one another, a quantitative arms race on the European continent quickly took hold, first initiated by the Soviets. This was demonstrated by troop increases and the modernization of their conventional forces stationed in Europe in 1949. The first decade of the US-Soviet arms race was highly unstable and marked by Soviet power grabs—which they believed they deserved as compensation for their sacrifices during WWII—in Eastern Europe. For example, Stalin, by choosing to blockade Berlin in 1948, wanted to force the Western powers to either accept Soviet predominance in East Germany, by abandoning West Berlin, or to compel the allies to abandon their plans for a separate West German
state.\textsuperscript{233} Political divisions between East and West were cemented by the creation of formal alliance organizations, most notably NATO and the Warsaw Treaty Organization, otherwise known as the Warsaw Pact. The United States, responding to Soviet re-armament and its bellicose statements and actions, pushed to increase the number of conventional forces under the command of NATO, and soon decided to re-arm West Germany in the mid 1950s.

While the beginning of the arms race in Central Europe was no doubt quantitative in nature, the rapid re-militarization of the Soviet Union was largely a result of domestic politics, and not simply an “action-reaction” arms race framework upon which Huntington’s thesis is built. The domestic structure model, which articulates that arms races are a product of domestic factors, has strong explanatory power for the initiation of the arms race in Central Europe. Indeed, George Kennan was one of the first in the US government to articulate the strong domestic reasons behind Soviet actions on the international stage. In his long telegram of 1946, Kennan stated that the “stress laid in Moscow on the menace confronting Soviet society from the world outside its borders is founded not in the realities of foreign antagonism but in the necessity of explaining away the maintenance of dictatorial authority at home.”\textsuperscript{234} For the Soviet Union, and to a lesser extent the United States, ideological considerations were an extremely important factor in international politics. To the Soviets, the United States had to be viewed as the enemy simply because it was the dominant capitalist nation, and therefore the Soviet decision to re-arm in Central Europe was not simply made in reaction to the foreign policies of the United States and its allies. Huntington’s arms-race theory has much more explanatory

\textsuperscript{233} Judt, 146
power once an arms race between two powers was already underway. It is much less
helpful in predicting if or when arms races will occur between nations.

Figure 3. Nuclear system innovation rates for NATO and the Warsaw Pact (WTO). This graph shows the number of newly introduced tactical nuclear systems in that year and the previous four years in Central Europe by NATO and WTO. Peaks represent a focus towards qualitative improvement. NATO has a rapid rise in the 1950s and the number of its new nuclear systems peaks in the early 1960s. The Warsaw Pact has a corresponding, but smaller, peak in the 1960s. After a period of détente, the WTO rapidly introduced new tactical nuclear systems in the mid to late 1970s, as does NATO in the early and mid 1980s during the Reagan administration.235

Under the right conditions, quantitative arms races can progress to a qualitative focus. This is usually initiated by the power that is trailing in conventional forces. True to Huntington, 1955 to 1965 saw a shift to nuclear weapons as the focus of the arms competition as each power began to develop and field tactical nuclear weapons, although the United States and NATO did so much more rapidly than the Soviets (Figure 3). The United States, trailing in the conventional balance, had nothing to lose—and much to gain—by placing more emphasis on tactical nuclear weapons in the defense of Europe.

Many within the Soviet military apparatus, however, resisted Khrushchev’s calls for a change in Soviet military force structure.

A qualitative arms race is not based on numbers alone; instead, it is more a function of the rate of technological advancement. The space race captured the spirit of the technological arms race occurring between the US and the Soviet Union at this time. Military budgets and conventional force levels on the continent stabilized. In order to integrate tactical nuclear weapons into US and Soviet force structures, radical changes in the military doctrines on each side were initiated.

An analysis of this qualitative phase of the Cold War provides key insights into arms races in general. A State trailing a conventional arms race, with the capability for technological advancements that can be employed on the battlefield, will almost certainly attempt to shift the decisive force of the arms race. Expensive military procurements made by the leading force can be easily negated through asymmetric advancements. Massive Soviet armies, for example, were held back by the threat posed by NATO’s relatively inexpensive tactical nuclear weapons. Faced with weapons that fundamentally shift the military balance, competing powers are forced to place technology at the forefront of the arms race in order to remain competitive.

There was indeed a slowdown in the arms race in Central Europe during the late 1960s following the qualitative arms race from 1955 to 1965. The Soviet Union, the United States, and their respective allies maintained stable force levels and both powers interacted with one another with increasing cordiality. Then, in a break from Huntington’s theory on the progression of arms races, there was a noted rise in Soviet conventional and nuclear forces. The Soviet Union, once it had devoted a sufficient level
of fissile material to strategic weapons, began to build atomic artillery at a prodigious rate in the mid 1970s.

Huntington is not wrong to say that arms competitions can shift from a quantitative to qualitative focus. Nor is he wrong to suggest that qualitative arms races are much more stable than their quantitative counterparts. But he is not completely right either. While his thesis can be a powerful predictor in certain phases of arms races, his thesis leaves out other outcomes entirely. Unlike Huntington’s thesis would suggest, the progression of the arms race in Central Europe shows that arms races are not nearly as sequential in nature, but can shift back and forth between quantitative and qualitative phases.

Arms races are not a one-way street. Indeed, Huntington’s logic on the progression of arms races can just as readily be applied to explain other shifts in phases of arms races. For example, while qualitative arms races can lead to stability, stability need not continue ad infinitum. Stability in arms races, which in most cases requires parity between competing nations, can itself promote a re-initiation of the arms race.

Huntington, while developing his theory, draws on examples from the 19th and early 20th century. While study of these historical arms races was valuable, the advent of nuclear weapons, added another layer of complexity onto arms races. Paradoxically, strategic nuclear parity, rather than continuing on a path towards stability, can shift the nature of competition to theater forces. Beyond a certain quantitative and qualitative level, additional strategic nuclear weapons contribute vanishingly marginal amounts to the overall balance, especially if one considers that in the Cold War thousands of strategic nuclear weapons were built and deployed, when only hundreds would have been
sufficient to cause overwhelming damage and suffering. Strategic nuclear parity between the United States and the Soviet Union meant that a nuclear ceiling was reached, after which no discernable gains could be achieved despite further strategic build-up (Table 1). Afterwards, if either the United States or the Soviet Union were to gain an advantage in the military balance, the arms race would have to shift towards theater level combat.

**Table 1. The Strategic Qualitative Race.** The years indicate date of testing or deployment. Most of these innovations were introduced first by the United States, but then quickly matched by the Soviet Union.236

<table>
<thead>
<tr>
<th>Technology</th>
<th>USA</th>
<th>USSR</th>
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<tbody>
<tr>
<td>Atomic Bomb</td>
<td>1945</td>
<td>1949</td>
</tr>
<tr>
<td>Intercontinental Bomber</td>
<td>1948</td>
<td>1955</td>
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<tr>
<td>Jet Bomber</td>
<td>1951</td>
<td>1954</td>
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<tr>
<td>Hydrogen Bomb</td>
<td>1952</td>
<td>1953</td>
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<tr>
<td>ICBM</td>
<td>1958</td>
<td>1957</td>
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<tr>
<td>Satellite Reconnaissance</td>
<td>1960</td>
<td>1962</td>
</tr>
<tr>
<td>Sub-launched Ballistic Missile</td>
<td>1960</td>
<td>1964</td>
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<td>Solid-fueled ICBM</td>
<td>1962</td>
<td>1966</td>
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<tr>
<td>ABM</td>
<td>1974</td>
<td>1966</td>
</tr>
<tr>
<td>Anti-satellite Weapons</td>
<td>1963</td>
<td>1968</td>
</tr>
<tr>
<td>MIRV</td>
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As all-out nuclear war became exceedingly unlikely, a limited nuclear conflict, involving conventional forces and tactical nuclear weapons, became even more likely. This forced further competition in these areas of potential conflict, as occurred in the 1970s and 1980s. Moreover, technological advancements in tactical nuclear weapons, such as higher accuracy coupled with lower yield, made them even more usable in conflict. This caused a vicious circle, and only increased the rate of the renewed arms race during the later stages of the Cold War. Although destabilizing, a rapid shift towards quantitative development need not lead to war. As seen in the later Cold War, this trend

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236 McNamara, Robert. *Blundering into Disaster.* (New York: Pantheon Books, 1986), 60
towards quantitative competition was a response to strategic parity, and does not necessarily indicate that a nation is determined to go to war.

Furthermore, rapid changes in the status quo can lead to a re-initiation of arms races. The United States, for over a decade, had maintained unquestionable strategic superiority in nuclear warheads and in delivery methods. The United States relied on this strategic and tactical superiority in order to maintain a credible defense of its allies in Europe. Once the Soviet Union had achieved strategic parity in the late 1960s and early 1970s, this seriously undermined the perception of the United States’ commitment to European security. If the credibility of US extended deterrence was to be maintained, the United States had to attempt to regain the nuclear upper hand, and of course, this required that the United States resume the arms race. Thus, abrupt strategic reappraisals of the perceived military balance, by either side, are destabilizing factors in arms races.

Huntington’s proposition that quantitative arms control agreements can promote qualitative competition, and vice versa, can be applied more broadly in arms races. These phenomena are part of the fundamental strategic logic of nations engaged in arms races. Once competing states have committed themselves to gaining superiority in the military balance, then constraints in competition in one area will only funnel competition into unregulated areas. In this way, arms control initiatives between two competing powers can have unintended consequences. As Huntington explains, it would be much more agreeable for two nations to come to quantitative agreements as this forces qualitative competition, which is inherently more stable. Similarly, perhaps arms control measures designed at limiting strategic weapons should be avoided, since this would place the brunt of competition onto theater forces that can be more readily used in combat—either
The conclusion of the arms race in Central Europe offers mixed results in terms of the predictive power of Huntington’s thesis. He was right to say that large expenditures in arms races can cause nations to quit, and the rising cost of continuing a quantitative and qualitative arms race on the part of the Soviet Union was a contributing factor to its eventual demise. The Soviet Union developed from a gigantic, unsophisticated land-based force after the Second World War into a technologically advanced superpower by the late 1960s. As weapons systems become more technologically advanced, the purchase and maintenance costs of such weapons rose rapidly, and this was a major driver behind

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the rising defense budgets of the United States and the Soviet Union. To some extent the Soviet Union’s psychological desire for massive forces remained even after it had become a first-rate technological power, as it did never phased out older nuclear technology to the same degree as the United States (Figure 4). This was also true with regards to conventional forces. As a result, the USSR eventually had massive amounts of certain weapons systems—which proved to be very expensive to maintain.

However, Huntington is wrong to say that arms control is generally only relegated to non-decisive forces, or that stronger nations will not agree to arms control. The United States, which had regained superiority in tactical nuclear weapons in the late 1980s, chose to destroy these weapons in the INF Treaty. The United States depended on nuclear weapons far more than the Soviet Union ever did, and thus there would seem to be no reason for Huntington to predict that the United States would ever give up a key part of its deterrent strategy, especially when it wasn’t struggling economically. As long as arms control measures place a disproportionately high burden on the lesser power, therefore cementing the established country’s military power, then arms control is indeed possible. When Gorbachev decided it was not in the interests of the Soviet Union to continue the arms race, then the United States willingly obliged.

**Implications for Future Arms Races: The United States and China**

China and the United States are more heavily dependent on each other economically than the United States and Soviet Union ever were. Moreover, the United States and China do not share deep ideological opposition to the same extent as the Soviet Union and the United States. Both countries, up until now, have benefitted from

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increased economic ties. This would seem to reduce the chances for an arms race. Nonetheless, it is understandable that the world’s second largest economy—which is still rapidly growing—would translate some of its newfound economic power into military power. Since the 1990s, China has increased its military budget almost every year by double-digits—spending rose from over $30 billion in 2000 to nearly $120 billion in 2010. As its economy is expected to continue to grow well into the future, the Chinese government will have ample resources to devote to its military forces. China has used much of this money to create military units that are more capable of regional force-projection. While China currently has the largest army in the world, with an active force of 2.3 million, the Chinese military is shifting development towards qualitative improvement, much like the Soviet Union in the early stages of the Cold War.

It is not out of the question that changes in the strategic balance in East Asia could eventually result in an all-out arms race between China and the United States. The possibility of an arms race would become increasingly likely if China were to threaten the core interests of American allies in the region, or if the United States considered Chinese military advancements to be hostile. China already has suspicions that the US military presence in East Asia is positioned to contain and control Chinese military power, and is actively developing area access and area denial (A2/AD) capabilities to minimize this weakness. And, militaries, by their nature, must assume the worst. In the words of Robert McNamara, “a strategic planner must be ‘conservative’ in his calculations: that is he must prepare for the worst plausible case and not be content to hope and prepare merely for the

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240 “The Dragon’s New Teeth” The Economist, (April 7-13\textsuperscript{th} 2012, US Edition), 27
242 “The Dragon’s New Teeth”, 27
most probable.”^243 This action-reaction logic is a powerful driver behind arms races.
Whatever the intents of China and the United States, both their military establishments have already been actively, if subtly, preparing for potential conflict. China, if it does decide to engage in an arms race with the United States, will seek to focus on qualitative advancements in order to more effectively mitigate US military superiority.

Much like the Cold War, China’s strategic nuclear posture is important in determining the course of a potential arms race. Since the People’s Republic of China (PRC) first acquired a nuclear capability in 1964, it has consistently proclaimed a no-first-use (NFU) policy, and has maintained that it will continue on this course. The two stated missions of the Second Artillery Corps, China’s nuclear forces, are to deter a nuclear attack on China and to ensure a successful second-strike in the event of a nuclear attack.^244 In order to successfully carry out these two goals, China has always maintained a certain “strategic ambiguity” in terms of nuclear force structure and size in order to reduce the chance of a successful first strike by another nuclear power, as well as to allow for the survivability of a second-strike capability. China has also avoided distinguishing between gradations of nuclear attacks on China, as all would theoretically be met with a strategic-level response.^245 For these reasons, the approximate number or locations of Chinese nuclear weapons has never been divulged.

While the true number of nuclear weapons China possesses is a closely held secret, the 2011 issue of The Military Balance estimates that China has 448 ICBM,
MRBM, SLBM, and LACM deliverable nuclear weapons. The majority of these weapons are medium and short-range weapons, as China is believed to have only 66 ICBMs capable of reaching the United States.\textsuperscript{246} This level of strategic nuclear forces, if well protected against a first-strike, provides China with an effective second-strike capability, although China cannot be said to have strategic parity with the United States. However, if China were to rapidly increase the number of strategic nuclear weapons it possessed, or it became known that China has a much larger amount than previously thought, this could trigger a larger arms race. Much like the Soviet Union and the United States in the Cold War, strategic parity can cause arms racing in the theater level of forces.

China continues to update its theater ballistic missile forces. China’s self-imposed limit on strategic nuclear weapons could lead to increased development of dual-use tactical nuclear weapons—much in same way as arms control can shift the focus of arms development. And unlike the United States and Russia, China is not a member of the INF treaty. This means that they are under no restrictions on the quantity or quality of intermediate and shorter-range nuclear weapons, and only provides further incentive for China to develop an advantage in an important weapons category for an A2/AD strategy. According to the 2009 edition of \textit{Ballistic and Cruise Missile Threat}, issued by the National Air and Space Intelligence Center, China has the most active missile development program in the world, and is rapidly increasing the number of missile types, along with improving the quality and quantity of their ballistic and cruise missile force.\textsuperscript{247}

\textsuperscript{246} \textit{The Military Balance 2011}. (London: International Institute for Strategic Studies, 2010), 230
\textsuperscript{247} National Air and Space Intelligence Center \textit{Ballistic and Cruise Missile Threat} (2009) \textless{} http://www.fas.org/programs/ssp/nukes/NASIC2009.pdf\textgreater{}, 3
It is important to note that China’s ballistic missile forces are believed to be dual-use. While many currently carry conventional warheads, they could be rapidly armed with nuclear warheads. Their DF-21 IRBM is being succeeded by a new version that may have MIRV capability, which would allow China to rapidly increase the number of deliverable nuclear warheads. Furthermore, China is attempting to increase the scope of its short-range ballistic missile capabilities by adding more sophisticated payload, increasing missile accuracy, and improving missile ranges.\textsuperscript{248} Western estimates place the numbers of DF-11s and DF-15s (SRBMs) at approximately 900 missiles and 200 launchers.\textsuperscript{249}

Chinese tactical nuclear superiority could radically alter the balance of power in eastern Asia during any potential conflict. Further, Chinese tactical nuclear predominance would have a high probability of sparking or increasing the intensity of an arms race. If tactical nukes were to be used on US allies or US forces, the United States could do little besides escalating to a full-scale strategic nuclear exchange with China in defense of its allies. Even without this occurring, the United States would have a significant credibility gap in its nuclear strategy. Without the option for an adequately scaled response, the United States may not decide to risk the destruction of major US cities in defense of its Asian allies. Thus, the United States would be forced to increase tactical nuclear forces in order to pose a credible deterrent to Chinese aggression against regional US allies.

Conventional conflict between the United States and China would almost undoubtedly have a naval character, and thus conventional arms competition will likely

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be focused on naval forces. Chinese conventional forces aimed at countering the US naval threat are already receiving significant qualitative improvements. For example, in 2009 China deployed the DF-21D, which is considered the world’s first anti-ship ballistic missile. The DF-21D is a modified MRBM mobile platform that most likely relies on support from over-the-horizon radar. This provides an excellent example of making qualitative advancements in order to shift the balance in China’s favor. Instead of a quantitative naval arms race, in which China would develop enormously expensive aircraft carriers in response to the aircraft carriers of the United States, China has developed a relatively inexpensive missile that could entirely negate the effective use of US aircraft carriers in a regional conflict with China.

The Chinese Navy is expanding its anti-ship missile forces in order to expand asymmetric capabilities. The People’s Liberation Army Navy (PLAN) employs both former Soviet and domestically developed missile systems on its submarines, destroyers, and other ships. The type 022 Houbei-class is a small, stealthy, and fast missile attack boat. It carries up to eight long-range anti-ship missiles. As of 2011, there were more than 65 of these vessels deployed in Chinese coastal waters.\(^{250}\) En masse, these would present a significant threat to any US aircraft carrier in or around Chinese coastal waters.

Like the Soviet Union, a focus on missile technology offers an easy way to quickly reduce the disparity of forces between the United States and China. A strong Chinese anti-ship missile force would likely reduce the importance of US carrier battle groups if effective anti-missile forces were not developed. Modern US aircraft carriers are simply too expensive to be risked in a conflict with China unless absolutely

\(^{250}\) *The Military Balance 2011*, 232
necessary. Moreover, while anti-ship missiles are cheap and expendable, aircraft carriers are not. Thus, if the United States was forced to engage China in a qualitative naval arms race, it will have to focus its efforts on forces that are not as vulnerable as aircraft carriers but which still offer the ability to project power overseas. Bureaucratic inflexibility in the US military establishment will mean that this is unlikely to occur until it is all too obvious that aircraft carriers have serious drawbacks in the face of growing Chinese anti-ship capabilities.

China is currently re-fitting the Ukrainian-origin aircraft carrier *Varyag*. Its ultimate purpose remains unclear, but it will most likely be used for training and technology transfer through reverse engineering. A mock up of its runway was spotted with satellite and hand-held photography in Central China in late 2009 and 2010.\textsuperscript{251} It is not likely that China will significantly expand its carrier program in the short-term, as more cost-effective options at countering a US threat in its regional waters, such as anti-ship missiles, will take precedence. An aircraft carrier capability even remotely close to that of the United States would require a significant long-term investment in resources and training. Thus, the aircraft carrier program is likely justified as a symbol of prestige and as an educational tool rather than by any serious attempt to match the capability of the United States.

Arms control measures are not realistic in the short-term. China would likely not favor qualitative restrictions, as this is how it likely intends to catch-up to the United States’ capabilities. For its part, the United States will neither agree to qualitative or quantitative limits, as it now holds a great advantage in both. Attempts to incorporate

\textsuperscript{251} The Military Balance 2011, 195
China into the INF treaty may channel Chinese competition into conventional forces, which has both desirable and undesirable side effects. It would limit the prospect of theater nuclear war, but at the same time it would make conventional war comparatively more likely.

The rise of information warfare is an area that Huntington’s theory on arms races, both in its original form and as applied to the Cold War, has heretofore not been applied. The Chinese military has made significant steps in incorporating network warfare into its military doctrine and force posture. The purpose of network warfare is to “link sensors, databases, commanders, and their troops to enable ever-faster execution of command decisions” while also limiting the information capabilities of one’s adversary.252 Similarly, China began to devote resources to computer network attacks in the 1990s, which include integrity, availability, and confidentiality hack attacks.253 Chinese hackers, whether or not they are formally tied to the Chinese military, are widely believed to be behind thousands of cyber attacks on US companies and US government websites.

The world is at the beginning of a potentially significant military revolution, but the application and scope of cyber warfare remains unclear. There is little information on how cyber-warfare would affect the progression of arms races, although cyber warfare could represent a version of qualitative competition that occurs on a much faster cycle of innovation. Undoubtedly, cyber competition is similar to a qualitative arms race in that it affords the lesser power an opportunity to rapidly catch-up to established powers. As

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252 Fisher, Richard D. China’s Military Modernization: Building for Regional and Global Reach (Stanford, CA: Stanford University Press, 2010), 112-118
253 Fisher, 119
cyber warfare is a relatively easy way to quickly gain an edge, there is little doubt that powers seeking to gain in arms races will place a strong interest in cyber capabilities.

Despite allowing for the constant harassment of an adversary, cyber warfare may actually lead to stable arms races due to the relatively low cost of developing this capability when compared to giant military build-ups and qualitative nuclear weapons improvement. The constant effort required to maintain an edge over one’s adversary would also tend to stabilize this potential arms race. Both the United States and China are vulnerable to cyber attacks on their military and non-military assets. The rapid innovation of cyber competition makes is extremely unlikely that either side could develop superior capabilities or protect against the possibility of attack for long stretches of time. While it is true that cyber competition allows China to catch-up to the United States much faster than a quantitative arms race, the likelihood of conflict would also decrease. There is no clear winner in a potential cyber confrontation, and therefore neither side will be particularly keen to go to war. For this reason, a cyber arms race may be the form of competition between China and the United States least likely to lead to open conflict.
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Appendix I

Data on force sizes used in the graphs are primarily drawn from two sources. Data on theater nuclear forces come from Karber et al., “Trends in the Deployment of Nuclear Weapons in Central Europe: 1948-1988.” This work was a paper presented at the Nuclear History Program at the Wye Plantation Conference in 1989. It drew on a variety of open source materials on what was known about nuclear force sizes and structures of NATO and Warsaw Pact forces. Data on conventional force trends were drawn from the three BDM Corporation publications, which were initially created for the US Defense Department, and have only recently been declassified. The BDM Corporation was a defense-contracting firm that was later acquired by TRW Inc., which was then purchased by Northrop Grumman in 2002. These data were not meant to be authoritative on the exact force sizes of the United States and the Soviet Union, but rather they were used to capture general force trends. For detailed information on force sizes and structures within the text, a variety of other sources were used (as cited), most notably *The Military Balance*, which is published by the International Institute for Strategic Studies in London. The IISS was highly regarded by both sides during the Cold War.