

Building Military Helicopter Capacity: Influences on Process and Effectiveness

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ABSTRACT

In 2015, the National Military Strategy of the United States of America listed building the capacity of partner nations as a key priority. By building military capacity, partner countries can become better equipped to fight ongoing insurgencies, transnational terrorist organizations, and other threats themselves, allowing the U.S. to shift focus and resources towards other areas that need attention. In today's battlefield, mobility and firepower are of the utmost importance. One capability that can address both of these areas is helicopters, which can greatly increase the effectiveness of a military and reduce the required number of ground troops (and therefore cost) needed to combat internal security threats. This paper seeks to address U.S. efforts to build military helicopter capabilities in partner nations and how five factors (perceived threat to the U.S., intended enemy countermeasures, terrain, national human capital, and national economics) can affect these missions. The cases of Colombia, Iraq, and Afghanistan will be examined to evaluate how the factors in each of these countries contributed to shaping the process and effectiveness of the respective U.S. capacity-building mission. This paper concludes by comparing the cases and evaluating how important and in what ways these factors influence missions, and how this information can be applied to U.S. missions and policy in the future.

Introduction

Since the end of the Cold War, the West has seen some of its greatest threats to security change from powerful state militaries to transnational extremist organizations operating from weak or ungoverned states. This shift from focus on large conventional conflict to limited wars has rendered less relevant the concept of “strategic air power”¹ given the need to carefully distinguish military targets (Bergerson 1980). Instead, the use of “tactical air power”² in support of ground campaigns, with helicopters playing a central role, has become more relevant (Bergerson 1980). In 21st century warfare, mobility has become increasingly significant, to the point where helicopters and airmobile capability have been called one of the most important factors making a military effective (de Durant, Michel, and Tenenbaum 2012).

In the current global security environment, it is impractical for the U.S. to unilaterally take action against all threats coming from weak and developing states. In *The National Military Strategy of the United States of America*, the U.S. lists building the capacity of developing states’ militaries as a priority so they will be able to take action against threats themselves, allowing the U.S. to become less involved and shift resources elsewhere (Joint Chiefs of Staff [JCS] 2015). However, no two countries are identical, and there are many factors that can influence whether building capacity, specifically in regards to military helicopter programs, will be effective. Therefore, it is important to

¹ Strategic Air Power can roughly be defined here as military aviation used to directly bring about defeat of the enemy, such as large-scale bombing campaigns used in World War Two to destroy strategic targets

² Tactical Air Power can roughly be defined as military aviation used in support of the campaign on the ground (Bergerson 1980).

determine how certain conditions will influence U.S. missions to build helicopter capacity and their associated security outcomes.

Despite the limitations of open-source information,³ many studies (e.g. Stinger 2009; de Durant, Michel, and Tenenbaum 2012; Moroney et al. 2009; Monroe 2008; Jones 2014; Grant, Comer, and Ehrhard 2007; JCS 2015) examine helicopter warfare and military capacity building, and some with specific focus on air force capabilities.⁴ Some studies that focus specifically on this type of capacity building argue that cost-efficiency must be a key priority of air forces in order to make this capacity sustainable (Moroney et al. 2009; Monroe 2008). Other studies focus on the tactical application of helicopters in warfare. Key findings here include the ability for helicopters to create a large battlefield presence with limited forces by allowing quick reaction times and the growing need for Special Operations Forces worldwide and the extreme importance of helicopters to their missions (de Durant, Michel, and Tenenbaum 2012; Jones 2014; Grant, Comer, and Ehrhard 2007). Other important literature pertinent to the effectiveness of helicopter capacity building includes the study of economic activity and military spending in developing countries (Looney 1987) and the effects of national human capital on military performance (Biddle and Long 2004).

Despite the body of work currently focused on the concepts of helicopter warfare and military capacity building, there are notable deficiencies when it comes to the application of both of these concepts together. Research on helicopters and their

³ “Open source” information refers to information and literature that is available to the general public, as opposed to classified information, which requires a government security clearance to access.

⁴ Air forces, in this use, does not mean simply the branch titled the “Air Force,” but all military forces that have air capabilities.

application in warfare is focused almost exclusively on the perspective of highly advanced militaries, such as the U.S., Russia, and other major powers. This causes problems because these advanced militaries have the resources to field large, top-of-the-line fleets and can take on all mission tasks if necessary. In contrast, developing militaries have much more limited resources and will have to choose how to prioritize them in their contribution to that country's overall military strategy. Most literature on military capacity building is not focused on helicopters, but either focuses on its applicability to overall U.S. global strategy or in the case of the more generalized air forces with less emphasis on helicopters (JCS 2015; Jones 2014; Monroe 2008; Moroney et al. 2009). This has led to a deficiency in research (at least among open sources) when it comes to the effectiveness of building helicopter capacity in developing states.

The purpose of this research is to generate hypotheses about the effectiveness of U.S. efforts to build helicopter capacity in developing partner nations by conducting a comparative case study of U.S. missions in the Colombia, Iraq, and Afghanistan. This study will focus on the relationship among in-country variables (like the presence of threats to U.S. security, enemy countermeasures, terrain, economic conditions, and human capital), their effects on the helicopter capacity-building mission, and the extent to which this new capacity achieves its desired effect. The knowledge this research intends to discover should be of particular interest to officials involved in military policy making as well as scholars interested in military policy.

The following sections review the unclassified literature to convey a basic knowledge of military capacity building, helicopter warfare in modern combat, and in-country variables important to the process and effectiveness of building helicopter forces.

After that, the design and methodology of this research will be explained and the case studies of U.S. missions will be analyzed. Finally, I will draw conclusions based on these findings in order to generate hypotheses for how the specified factors influence capacity-building missions and how the U.S. can apply such information going forward.

Building Capacity

As the most powerful country and military in the world today, the United States' security advantage is starting to erode in midst of rapid technological development and a changing security environment (JCS 2015). Since the attacks on the United States on September 11, 2001, the U.S. has been engaged in a war on terrorism,⁵ focusing mostly on threats posed by radical extremist organizations based out of weak, unstable states (JCS 2015). It even appears in recent years that the number of attacks and recruits to terrorist networks are on the rise and these organizations are becoming more threatening at home and abroad (Jones 2014). But with the rise of other military powers, such as Russia, Iran, North Korea, and China, the United States must shift its focus to the ability to combat large conventional forces, while simultaneously continuing to fight the war on terrorism (JCS 2015). This shift in focus must also be accompanied by an appropriate shift in military resources (JCS 2015).

As part of the *National Military Strategy of the United States of America*,⁶ the Joint Chiefs of Staff (2015) state that creating a strong global network of alliances is a top

⁵ Commonly referred to as the "Global War on Terror" (GWOT) under the George W. Bush administration and as "Overseas Contingency Operations" by the Obama administration (Wilson and Kamen 2009).

⁶ The NMSUSA is a report from the Joint Chiefs of Staff every five years listing the United States' military's strategy and goals as part of their contribution to the overall national security strategy.

national priority. In order to accomplish this task effectively, allies are broken up into two categories: advanced countries⁷ and “other partners”⁸ (JCS 2015, 10). To strengthen the alliance with other advanced countries, the U.S. uses joint military exercises in order to improve interoperability of our forces. These exercises are designed to increase combat effectiveness should our forces need to fight alongside one another, against both other militaries and extremist organizations (JCS 2015). With “other partners” the primary activity taken by the U.S. military is known as capacity building (JCS 2015).

Capacity building can be loosely defined as assisting and training a host nation’s military in order to increase its military capabilities. In a report titled *Building Partner Capacity* (2013, 1), the Government Accountability Office states, “The United States’ national security is inextricably tied to the effectiveness of U.S. efforts to help foreign partners and allies build their own security capacity, which is an important aspect of sharing the costs and responsibilities of global leadership.” This concept is especially important for partner countries with low governmental and policing capabilities, as transnational terrorist and criminal organizations can often operate largely unchecked, including using that country’s territory as a launching point for operations outside of its borders. Figure 1, taken from Jones (2014, 5-6), illustrates that there is a correlation between “the capacity of local governments to establish the rule of law in their countries” and the level of threat posed to the United States.

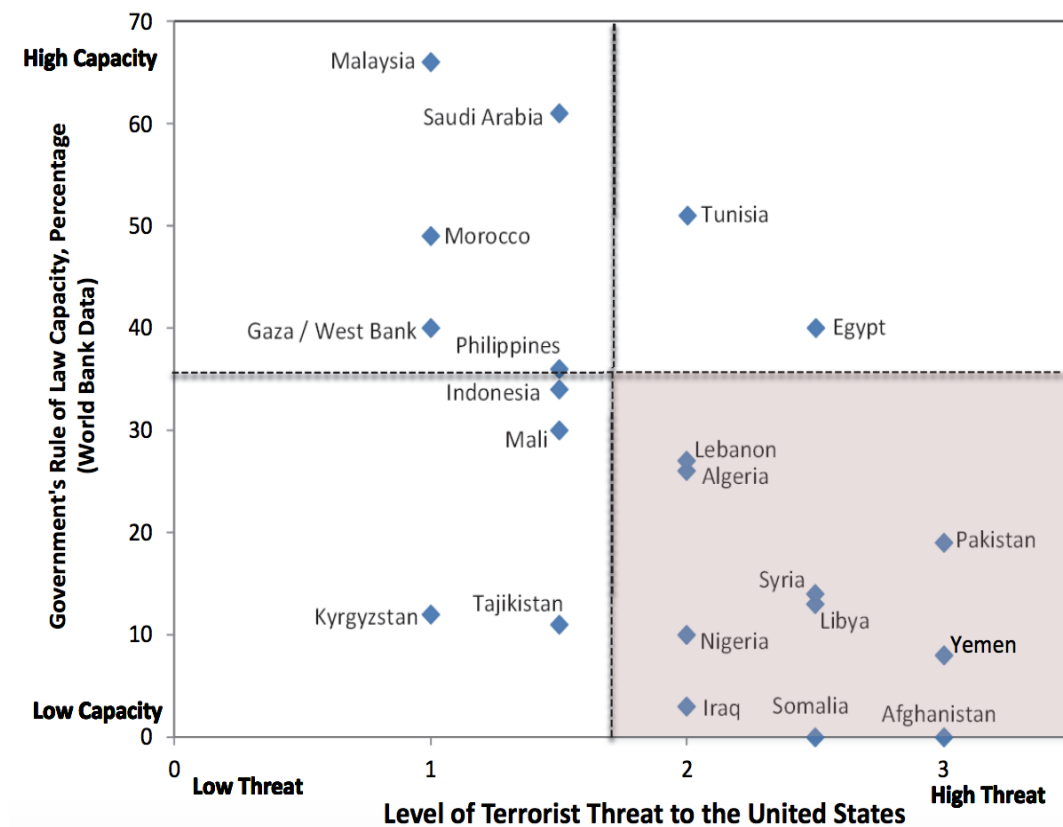
By building the capacity of allied and partner militaries, those nations can become effective at self-protecting and policing, ultimately allowing our military to fully leave

⁷ Listed in the NMSUSA (2015, 10) as “advanced partners like NATO, Australia, Japan, and Korea.”

⁸ Those considered allies and/or strategic partners but not listed above.

the area if these programs remain sustainable (Monroe 2008). This can then help our military shift resources in order to increase our focus on combatting rising state military powers (Monroe 2008). One method of building partner capacity that can be used to achieve U.S. strategic priorities is the creation and development of military helicopter programs.

Figure 1. “Countries of Concern for the United States”



Helicopters on the Modern Battlefield

The earliest military helicopter use dates back to World War II, performing support functions on the fringe and rear of the battlefields (de Durant, Michel, and Tenenbaum 2012). Shortly after, the first combat applications of helicopters came in the

Korean War with the U.S. and in Algeria with the French (de Durant, Michel, and Tenenbaum 2012). After Korea, the U.S. developed and refined this new battlefield technology and used it to create “unprecedented air mobility” for ground soldiers in Vietnam (Menon 2014). The ability for helicopters to work closely with ground forces also created large increases in the ability to direct fire for close air support of troops in contact (Stinger 2009, Bergerson 1980).

Much of modern combat has moved from the “smooth,” “linear” battlefields of previous conventional conflicts to “striated”⁹ spaces and limited wars against extremist organizations and insurgency groups (de Durant, Michel, and Tenenbaum 2012; Stinger 2009). During such wars, helicopters have been able to fulfill many military functions. Some of these functions include “intelligence acquisition, surveillance and reconnaissance, casualty evacuation (CASEVAC), logistics resupply, transportation of combatants and noncombatants, troop induction and extraction and... air-to-ground strike” (Menon 2014). Helicopters have become very effective in combat in this regard because they are able to compensate for limited ground forces by allowing quick reaction times, bypassing terrain barriers, and avoiding improvised explosive devices (IEDs)(de Durant, Michel, and Tenenbaum 2012; Menon 2014). Additionally, helicopters can provide effective close air support and threat detection to troops in contact (de Durant, Michel, and Tenenbaum 2012). Helicopters also play a vital role for Special Operations Forces, which have taken on a critical and expanding role in the war on terrorism (Grant, Comer, and Ehrhard 2007).

⁹ De Durant, Michel, and Tenenbaum (2012) refer to “striated” space as mountains, jungles, and cities. Areas where combatants were usually intermixed with the civilian populations and did not wear uniforms or anything to overtly distinguish themselves as combatants.

Factors affecting capacity building

In order to further U.S. strategic interests, an important question to guide U.S. decision making is “where, how, why, and with whom do we build partner capacity?” (Moroney et al. 2009, 65). While this paper focuses on only one aspect of “how,” the other questions will be looked at using existing literature on conditions that can affect missions to build helicopter capacity. By evaluating a partner nation’s threats, intended enemy countermeasures, terrain, economic conditions, and national human capital, a basic idea of how certain conditions (or sets of conditions) will affect a capacity-building mission should be established.

One of the first conditions the U.S. should evaluate in a country is the perceived level of threat to U.S. security interests. This condition is the reason why capacity is built in the first place, and the overall effectiveness of a capacity-building mission is measured by the new (or improved) capability to combat threats and increase U.S. security. Threats can vary in form and severity, both of which should be taken into account when determining whether the investment in helicopter capacity is worth the payout of potentially increasing security. Some examples of threats against U.S. security interests in weak states can include terrorist organizations (either plotting against the U.S. homeland, U.S. overseas targets, or U.S. allies and partners), transnational criminal organizations, and groups committing human rights violations (Grant, Comer, and Ehrhard 2007).

Another important condition when evaluating a country is the survivability of helicopters. Arguably the most important part of helicopter survivability is “the threat environment in which the aircraft must operate,” referring to the possession and use of advanced weaponry by intended adversaries (Kopp 2009). Helicopters are much more

vulnerable than other military fixed wing aircraft due to their slower flight, low altitude, and “high acoustic and radar signatures” (Kopp 2009). For these reasons, enemy possession of advanced Man Portable Air Defense Systems¹⁰ (MANPADS), early warning systems, and effective use of heavy machine guns and rocket propelled grenades can serve to negate the tactical advantage that helicopters provide (Kopp 2009).

The specific terrain inside a country is also of concern, as it is usually not expected that a partner’s helicopters will be used on missions anywhere outside of its borders when building capacity for internal defense purposes (Mouton, Orletsky, and Kennedy 2015). As with all aircraft, helicopter performance is dependent on environmental factors; however, due to the nature of helicopters operating close to the earth, the operational environment can be even more of a factor than with fixed-wing aircraft. Some of the primary environmental concerns are altitude, temperature, terrain features,¹¹ and distance (Mouton, Orletsky, and Kennedy 2015). When dealing with high altitude and hot conditions, such as in the mountains of Afghanistan, some helicopters may not even be able to climb to necessary altitudes carrying a full load of combat troops or supplies, let alone take off, land, or hover. This puts a limitation on what platforms are combat effective under these conditions, whereas there are more (and often less expensive) options for militaries operating in cool, low-altitude areas (Mouton, Orletsky, and Kennedy 2015). Distances from a base of operations can also further limit platform options, as some may not have the required range or will require in-flight refueling capabilities (Mouton, Orletsky, and Kennedy 2015).

¹⁰ Such as U.S. FIM-92 Stinger missiles or Russian SA-7 SAMs (Kopp 2009).

¹¹ Terrain features refer to things like mountains, which may cause severe altitude fluctuations.

Economic conditions and the effects on defense spending of the partner nation also must be taken into consideration given the high costs of acquiring, operating, and maintaining a fleet of military helicopters. In advanced countries, such as the U.S., government expenditures (including defense expenditures) are generally decided based on a perceived need or desirability, and then taxes are levied accordingly (Looney 1987). However, developing countries' expenditures seem to flow in the reverse order. For developing nations, a country's level of government expenditures is usually dependent on the ability to collect taxes, which is determined by its economic performance (Looney 1987). Poor economic conditions can significantly limit developing militaries in the amount they are able to self-fund their military, and often governments must request military aid or incur debt for funding (Looney 1987). However, economies are never static, and levels of expenditures change based on economic conditions, influencing a country's ability to fund the military on its own (Looney 1987). In short, the U.S. must evaluate the economic situations of potential partners to determine how much of the cost of a new capacity the U.S. will bear and whether that nation will be able to sustain the new capabilities over the long term so the U.S. can shift resources elsewhere.

Another condition important to capacity-building missions that U.S. officials must take into consideration when evaluating countries is national human capital. Biddle and Long (2004, 531) define human capital as it relates to the military as "the skills, health, literacy rates, and educational attainment of the civil population from which soldiers are drawn." Human capital was found to be a predictor variable in determining military effectiveness and has a direct correlation with military casualties per enemy killed (Biddle and Long 2004; Pilster and Bohmelt 2011). As it relates to high-tech equipment,

such as helicopters, Biddle and Long (2004) contend that militaries drawing from pools of poor human capital will have difficulty recruiting and training enough capable people to effectively utilize highly sophisticated weapon systems. To further the point of this effect on helicopters, Biddle and Long (2004, 531) make specific reference to “illiterate mechanics [having] great difficulty maintaining high-performance engines.”

Research Design

In the previous section, I reviewed the importance of capacity building to US security strategy and the role of helicopters in modern warfare. The major factors contributing to the effectiveness of helicopter capacity building include the host nation’s economic conditions, human capital, terrain, presence of enemy countermeasures, and perceived threat to the U.S. Based on current literature, I would expect conditions most favorable to helicopter capacity building to include countries that have cool climates with low-altitude terrain, a self-sustaining economy, high human capital, and threats that are high U.S. security interests and have no or few countermeasures.

In order to determine how a country’s conditions affect whether U.S. helicopter assistance will be effective, I will be performing a comparative case study of U.S. missions in Colombia (1999-2016), Afghanistan (2001-present), and Iraq (2003-2011). These cases all represent instances in which the U.S. engaged substantially in building helicopter capacity. These cases vary in significant ways in terms of all of the factors previously discussed, and in terms of the level of success of each program. It is likely that evaluation of the five factors, when different, can shed light on why cases attained certain levels of success. However, because of this variance, it will be difficult or impossible to

isolate the impact of each individual variable and determine concrete, independent causal relationships. Therefore, all cases will be analyzed in a narrative context to help give meaning and significance to the individual variables as they cumulatively contributed to the associated outcomes. In addition to analyzing variables in a narrative context, case evaluation will be broken up into four sections: country profile, security landscape, capacity-building process, and application of the capacity.

The country profile will include national measures and statistics to give a comprehensive idea of where each country stands in relation to each other and the rest of the world. These measures and statistics will primarily cover the factors of human capital, economics, and terrain. Other than pure statistics (such as literacy rates, GDP, military spending budgets, elevation, etc.), the UN Human Development Index and Education Index will be used for comparative purposes. The UN's Human Development Index (HDI) "is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have [sic] a decent standard of living" (United Nations Development Programme [UNDP] 2015). The Education Index is the specific component of the HDI dealing with knowledge and education.

The security landscape section is designed to give readers a basic understanding of the conflict and security situation surrounding the capacity-building mission. Given space restrictions, this section in no way intends to completely capture the full breadth of each conflict. Instead, this section will be used to highlight the circumstances in which the capacity-building mission is taking place in order to give it context. This context will become important to give a greater understanding of the process of building capacity and

how this capacity contributed to the conflict at large. This section will also address the presence of enemy countermeasures and the perceived threat to the United States.

The next section will address the capacity-building mission itself. The section will describe the mission and its progress in a narrative fashion that is intended to demonstrate how the factors contributed to and shaped the overall process. In this narrative, all available and relevant information will be included to help explain why the mission proceeded how it did. This will include (if available) why certain aircraft were selected, how large and fast the force grew, what challenges the mission encountered, and how much was spent to create these capabilities.

The last section evaluated in each case is the application of the new capability. The section seeks to address how the new helicopter capability was used to accomplish military objectives. While helicopters can never be credited with achieving strategic objectives alone, this section will evaluate how the new capacity contributed as an aspect of the overall military campaign and whether it held significant influence (positive or negative). Additionally, this section will evaluate the performance of the host nation in terms of sustaining this capability when the U.S. withdraws or decreases combat and financial presence (if it is applicable).

Once all cases are examined, I will make hypotheses about how and to what extent each factor influences the capacity-building mission and its associated outcomes. Backing up each hypothesis, I will use supporting evidence from the cases to support my claim. After presenting these hypotheses, I will conclude by speculating how the information and lessons learned from each of these cases can be used to best inform U.S. policy towards building helicopter capacity in partner nations.

The methodology of this research is based on the case study methodology of George and Bennett (1985). In *Case Studies and Theory Development in the Social Sciences* (1985, 67), they outline the method of the “structured, focused comparison” of case studies:

The method is “structured” in that the researcher writes general questions that reflect the research objective and that these questions are asked of each case under study to guide and standardize data collection, thereby making systematic comparison and cumulation of the findings of the cases possible. The method is “focused” in that it deals only with certain aspects of the historical cases examined.

This method is best suited for these cases given the variety of political phenomena involved in each situation, which will require a focused look at only the aspect of building military helicopter capacity and the associated effects. The data on each case will be collected in a uniform manner (to the extent that it is possible) that can best facilitate finding generalizable information applicable to a set of cases.

One weakness of this study involves the variation in the cases and the lack of control for alternative explanations. Given the few instances in which the U.S. engaged in helicopter capacity building on a large scale, there is a shortage of historical examples to draw from. Another weakness is the lack of concrete measures to assess increases in security due to helicopters, especially given that this is simply a capability, which must also be accompanied by many other considerations to produce strategic results. However, because the objective of this research is to generate hypotheses (and not to discover, confirm, or reject the existence of causal bonds between isolated variables), the weaknesses of this study still allow for adequate findings to be discovered.

COLOMBIA

Country profile:

Colombia is located in the northwest section of South America, where it connects to Central/North America at the border of Panama. It is 1,138,910 square kilometers, “slightly less than twice the size of Texas” (Central Intelligence Agency [CIA] 2017). Colombia’s terrain consists of coastal lowlands, central highlands and mountains (with the highest peak at 18,947 feet), and eastern lowland plains, with the average elevation in the country at 1,945 feet. The climate in Colombia is tropical along the coast and lower elevation areas, and cooler in the central highlands and mountains. Colombia is also 54.4% forest. A topographical map is shown in Figure 2.

The literacy rate in Colombia for adults (all those over 15 years of age) was 91% in 1996 and has steadily increased to 95% as of 2015 (UNESCO Institute for Statistics 2016). For ages 15-24 (those most likely to enter the military), this rate was 97% and 99%, respectively, for the same years. The mean years of schooling (for those 25 and older) was 6.5 years in 2000 and has since increased to 7.1 years in 2013 (UNDP 2015). Colombia currently ranks 97 out of 188 countries on the Human Development Index with a score of .720 in 2014, up from .629 in 1995¹² (UNDP 2015). For the same years, Colombia was scored as .488 and .621, respectively, on the Education Index.

In terms of economics, Colombia had a GDP of 92.507 billion USD¹³ in 1995 and increased to 296.09 billion USD in 2015 (World Bank and OECD 2016). In the most recent version of the *CIA World Factbook* (2017), Colombia had a government revenue

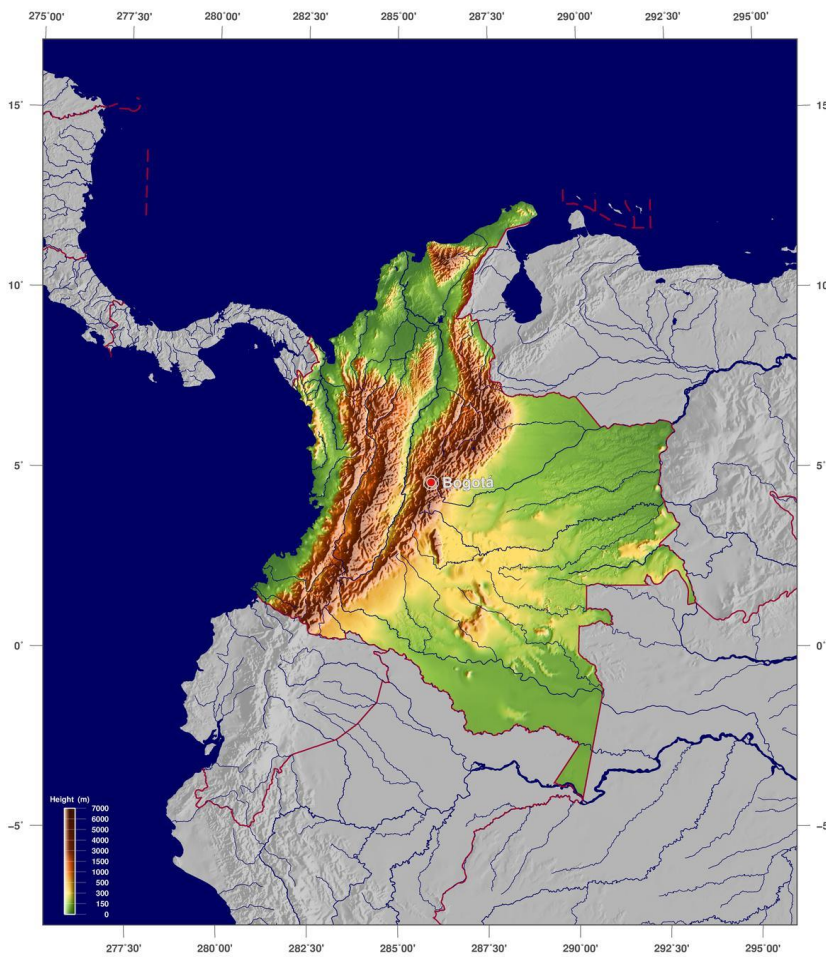
¹² As a reference, the U.S. was ranked 8 out of 188 and scored .900.

¹³ All numbers for GDP are adjusted for inflation to reflect current USD.

of 76.06 billion USD and expenditure of 84.23 billion USD, running a deficit of -3% of GDP (the U.S. ran a -2.9% deficit in this time period). In terms of military spending, Colombia has consistently spent between 3.032% of GDP and 3.86% of GDP between 1999 and 2015 (CIA 2017).

Figure 2. Topographical Map of Colombia

Colombia: shaded height and relief map



Map-License:
This map is licensed under the CC-BY-3.0 (<https://creativecommons.org/licenses/by/3.0/deed.en>). Please cite the GinkgoMaps-project and link back (<http://www.ginkgomaps.com>).

Parameter and used data:
Map Projection: Lambert (equal area); Map Center: lat 4.58°; lon -74.3°; vector data: Natural Earth (www.naturalearthdata.com) and OSMBG (www.osmbg.com); raster data: Geoware (www.geoware-online.com).

Security Landscape:

In 1994, Ernesto Samper was elected president of Colombia amidst allegations that he had received support from the Cali Cartel (Long 1995; Zaltzman 2015). Partly to combat these allegations, Samper focused much of Colombia's military resources (including aid from the U.S.) towards going after narco-traffickers and drug cartels (Zaltzman 2015). While this strategy led to the destruction of the Cali Cartel in the late 1990s, a vacuum was created that allowed Colombian insurgent forces known as the FARC (Revolutionary Armed Forces of Colombia) to flourish (Long 1995; Mejia 2016, Zaltzman 2015). During Samper's administration (1994-1998), the FARC captured 150 Colombian municipalities from the government and grew from 9,500 (1994) to 11,300 (1998) (Zaltzman 2015). In response, many civilians joined paramilitaries out of fear that the government couldn't protect them (CIA 1997). During this same period, paramilitaries grew from 2,100 to 4,500 (Zaltzman 2015).

In 1998, Andres Pastrana was elected president and placed a large priority on creating a peace deal with the FARC early in his administration. At this point in time, "only 50-60 percent of Colombian municipalities" were under government control (Zaltzman 2015, 6). As part of the negotiation efforts, a demilitarized zone roughly the size of Switzerland was established where the military vacated and only the police and Colombian government remained (Associated Press 2016; Zaltzman 2015). The FARC, uninterested in negotiations, forced out all government and police and took over the area. Additionally, during the administration of President Pastrana, Colombia experienced a 25% increase in kidnappings, 350 democratically elected mayors forced out of office, and

an additional 16% percent of Colombian municipalities abandoned by the government. The FARC also grew from a force of 11,300 in 1998 to 16,300 in 2002 (Zaltzman 2015).

Although during this time period the FARC gained strength, the Pastrana administration took steps that would eventually help defeat the FARC. One of the most notable steps was initially known as “President Pastrana's Marshall Plan for Colombia” (Zaltzman 2015). This plan was developed and authored by Colombian officials, but was later modified and received significant input from the U.S. The plan introduced in 1999, known as “Plan Colombia,” included large amounts of support from the United States and was intended to help decrease production and trafficking of drugs, improve the security situation, and help Colombia retake control of its territory (Mejia 2016). It is also important to note that as part of this plan, the United States’ primary concern was the production and trafficking of drugs, and therefore only authorized military assets donated by the U.S. to be used for counter-narcotics purposes (Shifter 2012; Zaltzman 2015). Nevertheless, by the end of the Pastrana administration the military was able to start winning battles against the FARC in addition to reducing the production of coca.

In 2002, Alvaro Uribe was elected president with the belief that the only way to address Colombia’s problems was to be in full control of the entire country. His five major objectives were: “consolidation of state control over all national territory; protection of the population; eradication of illicit drug activity; the development and maintenance of a deterrent capability; and the establishment of efficiency, transparency, and accountability” (Zaltzman 2015, 45). His new security strategy was carried out with support and aid from the U.S. under “Plan Colombia” and through a popularly supported “War Tax” (Forero 2002; Zaltzman 2015).

The use of Plan Colombia military assets was still initially restricted to only counter-narcotic targets until late 2002, when President Bush issued NSPD-18,¹⁴ officially declaring the FARC a terrorist organization (Mathis 2003; Zaltzman 2015). Plan Colombia assets could then be approved on a case-by-case basis to go on missions against the FARC. This later changed as well when U.S. personnel were killed in attacks by the FARC, and the U.S. changed its policy allowing all assets to attack FARC targets without embassy approval in February 2003.

With all of the Plan Colombia assets now in play, the military was much better equipped to go after the FARC. One of the main additions to the military's effectiveness was the air mobility capabilities added by the Plan Colombia Helicopter Package (PCHP), which allowed the deployment of troops to "vulnerable/high risk population areas" (Zaltzman 2015, 48). This new ability also allowed troops to take higher risks knowing they could quickly receive close air support and medical evacuation (MEDEVAC), increased the number of mobile brigades from 9 to 17, and created a new method of supply allowing troops to continuously occupy more areas once they had been cleared.

By 2007, attacks by the FARC and paramilitaries had ended and over 350 municipalities were reoccupied (Zaltzman 2015). In operations "Libertad Uno" (mid-2003) and "Libertad Dos" (early 2004), the military was able to break the guerilla ring around Bogota, take over all core FARC bases in three years, and force the FARC to

¹⁴The National Security Presidential Directive (NSPD) - 18, officially declared the FARC a terrorist organization, which authorized the U.S. military to assist in tracking down Colombian terrorists with a corresponding shift in resources "previously used in anti-drug operations" towards operations against terrorist organizations (Mathis 2003, 14).

disperse into the jungle (Zaltzman 2015). After 2007, Colombia's military capabilities continued to increase and the military began to pursue FARC high-value targets using new methods of intelligence gathering and precision-guided munitions (Zaltzman 2015).

During Uribe's administration, the security situation improved dramatically. Paramilitaries were demobilized, 22,000 guerillas deserted the FARC and other armed groups and entered rehabilitation programs,¹⁵ and over 350 municipalities were consolidated under government control (CIA 2017, Zaltzman 2015). Crime also diminished during this period, from 28,000 murders and 2,800 kidnappings in 2002 to 15,000 murders and 300 kidnappings in 2009 (Zaltzman 2015). From 2000 to 2013, the drug-related economy also dropped from \$7.5 billion to \$4.5 billion (Mejia 2016).

In 2010, Manuel Santos became president with the objective of consolidating the gains made by the Uribe administration. At this point, the "FARC no longer represent[ed] an existential threat to the [Government of Colombia]," but Santos hoped a peace deal could be signed to allow the military to re-focus on criminal gangs and narco-traffickers (Zaltzman 2015, 13). Peace negotiations began in 2012, this time with government in control of around 90% of municipalities, and a formal treaty was signed in November 2016 (CIA 2017).

In regards to enemy countermeasures, the FARC had not shot down any Colombian military helicopters as of July 2013 (McClesky 2013). Although it would seem that the use of MANPADS would have been a FARC priority given the effectiveness of Colombian helicopters, the FARC did not appear to possess any

¹⁵ It should also be noted that other than those that entered rehabilitation, many others who deserted the FARC did so only to rejoin criminal gangs and narco-trafficking groups (Zaltzman 2015).

MANPADS until 2012 (McClesky 2013, Pettersson 2013). Even at this point, it is unclear as to how many are possessed and what condition they are in (McClesky 2013). As of now, it appears that only one Colombian helicopter has been shot down by the FARC, and it was not from MANPADS (Rosser 2015).¹⁶

Building the Capacity:

Before receiving assistance from the United States, the Colombian military possessed some helicopter capabilities. However, this force was considered “primitive” and was seriously lacking support in terms of personnel, spare parts, and maintenance (Zaltzman 2015, 24). There was poor aviation infrastructure and training programs for Colombian pilots and aircraft maintainers. In 1998, a few years before the PCHP would take effect, the Colombian Army had eighteen helicopters and the Air Force had forty-seven.¹⁷

In 1999, the “Plan Colombia Rotary Wing Security Force Assistance Capability Package” (more commonly known as Plan Colombia Helicopter Package, or PCHP) comprised around \$500 million of the initial \$860 million total aid package of the larger Plan Colombia (Zaltzman 2015). This package was to include “equipment, training institutions, and a national logistics pipeline” (Zaltzman 2015, 38). For aircraft, this included the donation of twenty-five Huey-IIIs, thirty-one UH-60Ls, and fifteen UH-1Ns to the Army and five AH-60Ls to the Air Force, arriving from 2000-2002 (Zaltzman

¹⁶ It is also contested as to whether this helicopter was shot down at all or was brought down due to mechanical failure (Rosser 2015).

¹⁷ These numbers only reflect helicopters that could be used operationally (i.e., not helicopters used for training purposes).

2015).¹⁸ The flight school at Melgar, which had previously only provided very basic training, was greatly enhanced and was given nine OH-58s and fourteen UH-1Ns strictly for training purposes (Zaltzman 2015).¹⁹ Three additional specialty schools were established for aircraft maintainers, including “one for crew maintenance training,” “one for engine maintenance,” and “one for advanced avionics” (Zaltzman 2015, 40). The U.S. private military corporation DynCorp was also hired to establish and run a logistics pipeline to provide the helicopters with supplies, fuel, and spare parts (Zaltzman 2015).

The U.S. provided contract pilots and mechanics to help with the fleet until the Colombian military could provide trained personnel of its own (Zaltzman 2015). The schools were initially run by DynCorp and overseen by U.S. Army Technical Assistance Field Teams (TAFTs). The U.S. Army TAFTs were also assigned to assist the Colombian Army Aviation Brigade with “advanced aviation tactical planning and techniques” and oversee the PCHP fleet in terms of sustainment,²⁰ maintenance, safety, and standardization (Zaltzman 2015, 40).

By 2007, 218 pilots had graduated the flight school at Melgar²¹ and the three specialty schools had produced 133 mechanics and 165 crewmembers (Zaltzman 2015). At this time Colombia possessed 112 helicopters in the Army and fifty-four in the Air Force that were all in combat usage against the FARC (Zaltzman 2015).²² DynCorp still

¹⁸ The national police also received 2 UH-60s and 12 Huey IIs in a different aid package under Plan Colombia (Zaltzman 2015).

¹⁹ Additionally, training for Colombian helicopter pilots was also conducted at Fort Rucker.

²⁰ Sustainment, in this context, is referring to primary objective of the logistics pipeline: keeping helicopters properly supplied with support features, including fuel, spare parts, support personnel, weapons, and other supplies.

²¹ This was “a 700 percent aggregate increase over 7 years” (Zaltzman 2015, 58).

²² This excludes helicopters used solely for training purposes.

conducted approximately 70% of training, aircraft maintenance, and sustainment but the Colombian military began to take on more of the work (Zaltzman 2015).

By 2012, the Colombian military acquired 25 more helicopters²³ in addition to those in the fleet pre-2000 and those donated under the PCHP.²⁴ As of 2015, the training school at Melgar “continues to produce world-class pilots” and now trains pilots from other Latin American militaries (Zaltzman 2015, 71). Additionally, Colombian military personnel now conduct the vast majority of aircraft maintenance and sustainment and run the logistics pipeline as DynCorp continues to turn over responsibilities. The Colombian military has also created a Joint Air Command Center that is able to monitor the real-time status of aircraft and crews and plan, launch, and coordinate operations “within an hour of receipt of [actionable] intelligence” (Zaltzman 2015, 70).

Overall, the PCHP helped create the ability for the Colombian military to have a substantial and highly capable fleet of helicopters. According to Mario Zaltzman (2015, 72),

The Colombian military is now recognized internationally as global [sic] center of excellence and subject matter expertise in respect to development, sustainment and execution of a rotary wing capability in the context of counter insurgency operations... The PCHP continues to provide Colombia an unlimited pipeline of talent in terms of flying, maintaining, and sustaining a large fleet of helicopters.

With the help of the United States, Colombia has been able to develop a very high caliber helicopter force, and one that was applied in combat with a great degree of success.

²³ All of these additions were to the Army’s fleet, while the Air Force remained constant.

²⁴ Additional helicopters included 39 UH-60Ls, 5 Mi-17, 4 Huey-IIs, and 7 Si-70s (Zaltzman 2015).

Application of the Capacity:

Before the PCHP, the Colombian military helicopter force was poorly equipped and organized. It suffered from a shortage of helicopters and pilots and had very poor maintenance capabilities (Zaltzman 2015). The pre-2000 helicopter fleet was simply not large or advanced enough to meet the demand of the military in its engagements with the FARC and “[did] not appear to have been employed in any significant manner” (Zaltzman 2015, 26).

After the implementation of the PCHP, the capabilities of the Colombian military were enhanced greatly, but were limited to only targeting drug cartels and narco-traffickers. During this time, the better-equipped and supported PCHP helicopters battled the drug cartels while the pre-2000 fleet fought the FARC. This policy did cause some problems in that PCHP helicopters were initially not even allowed to be used in support of police under attack by the FARC, even when their helicopter support was in range and could have saved lives (Zaltzman 2015). However, this restriction was eventually lifted.

Once the restriction on using PCHP helicopters to target the FARC was lifted by the NSPD-18, these helicopters could be used on case-by-case approval by the U.S. Embassy. This was later lifted as well and allowed the full helicopter force of both pre-2000 and PCHP helicopters to target the FARC in February 2003.

Immediately when PCHP helicopters were unrestricted, they began supporting defensive operations by transporting troops and supplies to remote locations and providing MEDEVAC, extraction, or CAS in response to an attack (Zaltzman 2015). Later, the helicopter force was used in “Plan Patriota” and “Operation Libertad Dos” to allow rapid deployment of Colombian forces to attack the FARC “when they were most

vulnerable” (Zaltzman 2015, 59). The full employment of the PCHP now allowed for consistent and rapid support for troops in counterinsurgency operations. This meant troops could be bolder in their attacks and allowed them to hold remote areas after clearing them knowing they had a continuous line of supplies and access to MEDEVAC, extraction, CAS, or reinforcements if they needed it (Zaltzman 2015).

This new capability, once the PCHP was fully implemented, provided “asymmetric military dominance over the FARC” (Zaltzman 2015, 59). It was during the following three years after the NSPD-18 where the Colombian military was able to retake the majority of its municipalities, major highways, and mountain corridors and “systematically” defeat FARC insurgent forces (Zaltzman 2015).

In addition to military application against the FARC, helicopters were also used to provide transportation for personnel and resources as part of the government’s “Consolidation Program” to create government presence and services in remote areas. Along with the continuous resupply of military and police in remote areas, this enabled the government to create a deterrent to keep the FARC from returning to the secured areas.

Since the employment of the full PCHP, the FARC “no longer represents an existential security threat” and the success of the Colombian military was made largely possible by building the capacity of its helicopter program (Zaltzman 2015, 13). Helicopters were obviously not the only part of the Colombian counterinsurgency strategy and cannot be given all of the credit, but many of the accomplishments of the military would have been extremely difficult had it not been for the tactical advantage

provided by helicopters (Zaltzman 2015). This case represent one of the most successful instances where U.S. efforts to build helicopter capacity has paid off in a major way.

IRAQ

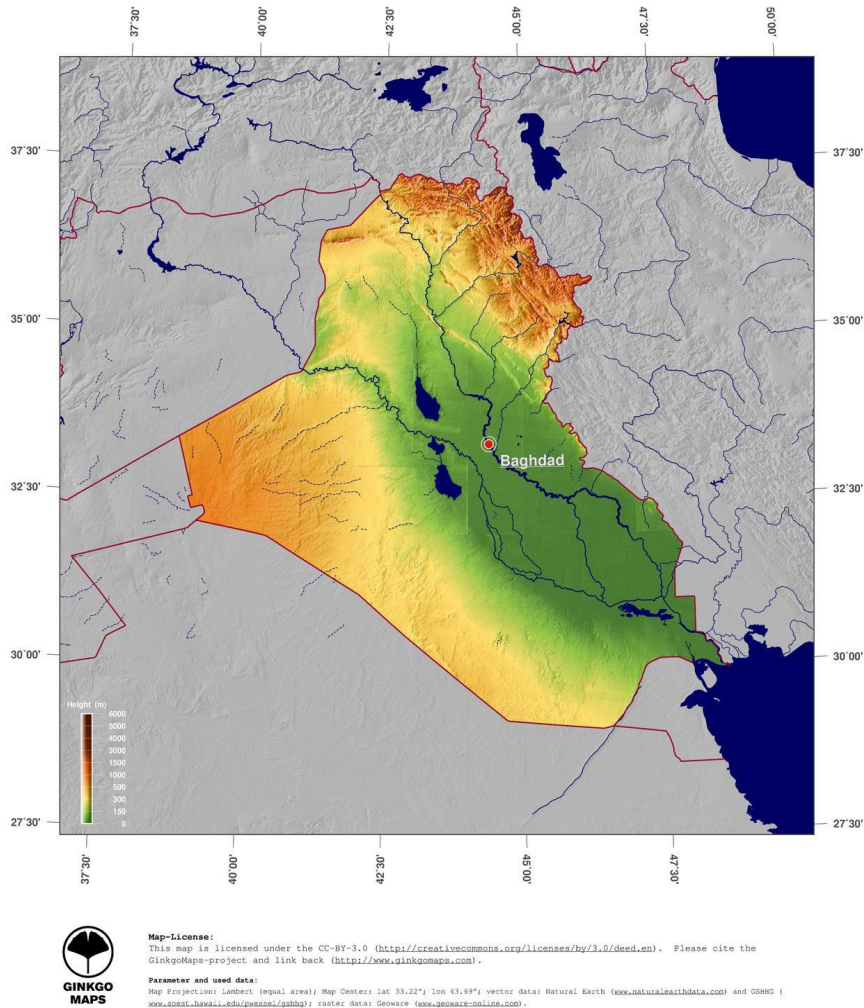
Country profile:

Iraq is located in the Middle East, north of Saudi Arabia and west of Iran. It is 438,317 square kilometers, or “slightly more than three times the size of New York state” (CIA 2017). The terrain in Iraq is mostly plains, with mountains close to the northern border and some marshes on the eastern border. The average elevation is 1,024 feet with the highest point standing at 11,847 in the northern mountains (CIA 2017). Iraq’s climate consists of mostly desert with mild to cool winters and dry and hot summers. A topographical map is shown in Figure 3.

The literacy rate for adults in Iraq was 74% in 2000, increasing to 80% in 2015 (UNESCO Institute for Statistics 2016). For ages 15-24, literacy was slightly higher at 85% and 82% for the same years (UNESCO Institute for Statistics 2016). The mean years of schooling in Iraq for those over 25 was approximately 5.8 in 2005 and 6.4 by 2014 (UNDP 2015). On the Human Development Index, Iraq ranked 121 out of 188, with a score of .630 in 2005 and .654 in 2014 (UNDP 2015). On the Education Index, Iraq received a score of .574 in 2005; this decreased to .493 in 2010 and 2015.

Figure 3. Topographical Map of Iraq

Iraq: shaded height and relief map



A few years after the 2003 U.S. invasion, Iraq's GDP was 49.995 billion USD (2005)(World Bank and OECD 2016). It has since increased to 380.192 billion in 2013, then down to 296.08 billion in 2015 following a drop in the price of oil, the largest economic sector and provider of 90% of government revenue (CIA 2017; World Bank and OECD 2016). The most recent *CIA World Factbook* (2017) listed government revenue at 52.43 billion USD with a government budget of 77.87 billion (a deficit of -

16.3% of GDP). Military expenditures for the Iraqi government were 2.88% of GDP in 2010 and increased to 8.7% of GDP in 2014 following a drop in gas and a rise in the fight against ISIS.

Security Landscape:

In President Bush's 2002 State of the Union Address, Iraq was listed as a part of the "Axis of Evil" (Caldwell 2011). In October of that year, Bush also claimed that Iraq possessed Weapons of Mass Destruction and a war resolution passed Congress. On March 20, 2003, the U.S. military invaded Iraq and had overwhelmed and toppled the Saddam Hussein regime by April 9 (Council on Foreign Relations [CFR] 2017).

Although "Mission Accomplished" was declared in Iraq on May 1, lawlessness and skirmishing continued in the country (CFR 2017). In May, the U.S.-led Coalition Provisional Authority disbanded the Iraqi military and fired all government employees associated with Saddam's Baathist party. These actions led to widespread unemployment that contributed to the deterioration of the security situation in Iraq (Dobrinsky 2014). By July of 2003, it was acknowledged that Iraq would be "a classic guerilla campaign" (Caldwell 2011, 280).

In early 2004, Al-Qaeda in Iraq (AQI) launched a wave of suicide attacks that killed hundreds and "stok[ed] sectarian resentment" (CFR 2017). In September, U.S. troops battled insurgents in Fallujah, where the fighting resulted in an estimated 1,200 insurgents and 800 civilians killed. By this time the death toll for U.S. troops had reached 1,000 and Pentagon officials stated that insurgents controlled important parts of central Iraq (Caldwell 2011; Crichton, Lamb, and Jacquette 2013).

Heavy fighting continued in 2005 and by October the death toll for U.S. troops had reached 2000. In February of 2006, “Sunni extremists destroyed the gilded Shiite shrine in Samarra,” which sparked extreme sectarian violence and is referenced as the start of “sectarian bloodletting” (CFR 2017). That year, sectarian violence and insurgent attacks on security forces increased, IED attacks became more sophisticated and dangerous, and some coalition members started to withdraw troops (International Institute for Strategic Studies [IISS] 2007). By the end of the year, 34,000 Iraqi civilians were killed, the U.S. death toll surpassed 3,000, and President Bush admitted that the U.S. was no longer winning the war (Caldwell 2011; United Nations 2007; Crichton, Lamb, and Jacquette 2013).

In early 2007, Bush announced “the Surge,” a commitment of an additional 30,000 U.S. troops to Iraq to improve the security situation (CFR 2017). In February, 28,000 additional troops were actually sent (Caldwell 2011). By this time, it was acknowledged by the U.S. that Iraq was in a full civil war (Raz 2007). In addition to “the Surge,” the U.S. began recruiting Sunni tribe members to take up arms against AQI in the “Sunni Awakening.” Although these two facets were implemented in 2007 and would eventually contribute to improving the situation, it was the deadliest year for U.S. troops in Iraq.

In 2008, the security situation saw an overall improvement and a reduction in civilian casualties. By the end of this year, there was an agreement in place to withdraw troops by the end of 2011. On June 30, 2009, U.S. troops started to withdraw from cities and turn over security responsibilities to Iraqi forces despite skepticism about Iraqi

military capabilities. The year 2009 also had the fewest U.S. combat deaths in Iraq since the invasion (CFR 2017).

By the end of August 2010, the U.S. combat mission officially ended. Around 50,000 U.S. troops remained behind to continue training Iraqi forces as part of Operation New Dawn. As scheduled, all troops, including those training Iraqi forces, withdrew from Iraq on December 18, 2011.

A few years after the withdrawal of U.S. and coalition troops, a terrorist organization formed from the remnants of AQI and the al-Nusra Front, known as the Islamic State in Iraq and Syria (ISIS) began a large military offensive in Iraq in early 2014 (John 2017). ISIS quickly captured multiple major cities in Iraq and Syria, killing many Iraqis and displacing over a million (Cable News Network [CNN] 2016). By June, the group announced the formation of a Caliphate, which would carry out brutal executions, multiple terrorist attacks, and create a massive refugee crisis (John 2017).

It is reported that in many instances the Iraqi Army “simply turned and ran in the face of an assault by an insurgent force,” allowing ISIS to seize vast amounts of Iraqi weapons and vehicles (many donated by the U.S.) from multiple government and military bases (Chulov, Haramy, and Ackerman 2014). The U.S. and other countries started conducting airstrikes against the group in August 2014 and officially began “Operation Inherent Resolve” that October (CNN 2016). By late 2015, Iraqi forces were able to take back Ramadi, Tikrit, and the Baiji oil refinery (Glenn 2016; Stanton 2015).

In 2016, Iraqi forces with the help of various armed groups (including Shia militia and Kurdish Peshmerga) were able to take back various cities and strongholds, including

Fallujah (CNN 2016). The battle to retake Iraq's second largest city, Mosul, began in October of 2016 and continues to the time of this writing.

In regards to the possession of advanced countermeasures, both during the initial U.S. occupation and in the fight against ISIS, there have been numerous documented cases of the use of MANPADS (Grossman 2014; CNN 2003). Some of these weapons are suspected of having been taken from Iraqi military depots in 2004, as well as stolen by ISIS from Syrian airfields (Kimball 2013; Gibbons-Neff 2014). These weapons have brought down both U.S. and Iraqi helicopters.

Building the Capacity:

During the Iran-Iraq War in the 1980s, Iraq had the sixth largest air force in the world (de Wind 2011). This air force was mostly destroyed during the First Gulf War in 1991, where large numbers of aircraft were destroyed in the air and on the ground, and many Iraqi pilots fled to Iran with their aircraft (de Wind 2011). These aircraft were never returned. Before the 2003 invasion, Saddam Hussein believed using aircraft to defend the country would be futile against the United States, and none took to the skies to combat U.S. aircraft (de Wind 2011). He believed the invasion would be short and he would remain in power afterwards, so he stripped and buried many aircraft in the sand. No aircraft in Saddam's air force would ever be used again.

After the invasion, a Coalition Provisional Authority order (CPA-22) created a mandate to form an Iraqi military, including an air force (Allardice and Head 2007). The Iraqi Air Force (IqAF) began in 2004, with only thirty-five personnel, and the Coalition Air Force Transition Team (CAFTT) was established in November of 2005 (Quigley

2007; Bauer 2007). The IqAF “started from almost zero,” but was lucky in that it retained “a large cadre of trained and experienced pilots and engineers from before the 2003 US invasion” that could create a foundation of leadership and direction (Shuster 2011; Associated Press 2012). Nevertheless, this task was still considered a “daunting challenge” (Shuster 2011). In terms of the actual building process, the U.S.-led CAFFT decided they would “focus on presenting options to the new service, not directing its growth,” in this way giving the IqAF more autonomy in how it would develop (Ovel 2005).

The CAFFT first began retraining the old pilots, who were an average age of forty-three and hadn’t flown in a long time (Allardice and Head 2007). Recruiting and training new pilots and personnel would not take place until late 2007, when the first basic training course and flight schools began operating (Allardice and Head 2007; Quigley 2007). It was also noted that despite poor conditions and infrastructure, the dropout rate in the IqAF was very low and it took roughly the same amount of time to train an Iraqi pilot as it did a pilot in the United States (Flores-Janecek 2007; Hoversten 2008).

In 2007, the helicopter fleet was still not well developed and only around three helicopters were capable of being flown outside military bases (Curfman 2008). As the year progressed, the IqAF began receiving Mi-17 and Huey II helicopters either donated by foreign governments or procured by the Iraqi government (Report to Congress 2007; Quigley 2007). By 2008, the helicopter fleet had “evolved by leaps and bounds” but was still not fully developed (Curfman 2008). It had, however, increased from flying around thirty sorties per week in 2007 to near 380 per week the next year (Hoversten 2008). By

early 2008, the IqAF's helicopter fleet consisted of thirty-seven helicopters (IISS 2008).²⁵ One notable attribute about this fleet is that there were no platforms procured specifically for attack, as the IqAF placed more emphasis on transport, CASEVAC, and ISR at this time (Allardice and Head 2007; Hoversten 2008; Report to Congress 2007).

The CAFFT (changed to Iraqi Training and Advisory Mission - Air Force, or ITAM-AF, in 2009) continued to build the IqAF and by 2010 there were 207 total pilots and 167 in the training pipeline (Report to Congress 2010).²⁶ The Iraqi government continued acquiring more aircraft, which included a deal for twenty-two Mi-17MM, a newer model with advanced avionics and defensive suite, and six SA-342 Gazelle with attack capabilities (Report to Congress 2010). By early 2010, the IqAF's helicopter fleet consisted of over fifty-eight helicopters (IISS 2010).

The U.S. was scheduled to fully withdraw from Iraq by the end of 2011, including the end of the ITAM-AF mission. Iraq was unable to fully conduct all aircraft and infrastructure maintenance capabilities and would require contractor support after the U.S. withdrawal (Report to Congress 2010, Slavin 2011). At this point, the IqAF was rated as achieving "Minimum Essential Capability" in all areas except air space defense and heavy airlift (neither provided by helicopters)(Report to Congress 2010). Although it was stated that "U.S. trainers were generally optimistic about [IqAF] pilots," there was still skepticism about whether the IqAF was ready to take over full responsibility (Slavin 2011). Shortly after leaving, the Iraqi helicopter fleet consisted of seventy-nine

²⁵ This included 14 Mi-17, 2 PZL W-3WA, 5 Bell 206, and 16 Huey Hs (IISS 2008).

²⁶ The total number of pilots includes both fixed and rotary wing pilots.

helicopters: twenty-six Mi-17, six SA-342 Gazelle, ten OH-58, eight Mi-171sh, sixteen Huey II, ten Bell 206B3, and three Bell T407 (IISS 2012).

After the ITAM-AF officially ended, the Iraqi helicopter fleet was transferred from the Air Force to the Army. Iraq continued to expand its fleet, including making a deal worth \$4.3 billion in 2012 with Russia for the supply of Mi-28 and Mi-35 attack helicopters and platform specific training (Donald 2014). As of early 2017, Iraq's helicopter fleet consists of around 154 helicopters (IISS 2017).²⁷

Application of the Capacity:

Unlike the case in Colombia, the United States was heavily involved in the fighting in Iraq, including the use of U.S. air power. The large and highly advanced U.S. fleet worked in conjunction with the Iraqis and contributed to the overall fight in Iraq. This meant that any shortcomings in the combat applications of the Iraqi helicopter fleet could be supplemented by the use of U.S. air power, so it is difficult to determine the effectiveness of Iraqi helicopters before the U.S. withdrew. Even after the U.S. withdrew, the next main military conflict in Iraq was the campaign against ISIS, which received heavy U.S. and coalition air support since August of 2014 (Terkel 2014). According to Iraqi Major Muthanna Hanum, "If we don't have the capabilities to deal with it then the coalition is called to handle it" (*Daily Mail* 2016).

In the campaign against ISIS, the helicopter fleet (which was transferred to the control of the Army) was still considered "fledgling" but was "deployed [in] full force in

²⁷ This includes 15 Mi-28, 14 Mi-35, 4 SA342, 24 Bell IA407, 23 H135M, 19 Mi-17 (all variants), 10 OH-58, 16 Huey II, 10 Bell 206B3, and 19 Bell T407

the battles for Tikrit and Baiji” (Delalande 2016, *Daily Mail* 2016). This seems to have come primarily in the form of airstrikes and close air support performed by the Army Aviation’s attack helicopters, which now represent half of all non-training helicopter squadrons (IISS 2017, *Daily Mail* 2016).²⁸

With regard to transport and support for foot soldiers, *The Military Balance 2017* stated that most major combat movements of foot soldiers involved deploying from armored vehicles, usually “armoured HMMWVs and tanks, often with armoured bulldozers” (IISS 2017, 354). With the less restrictive terrain in Iraq, it appears the Army is able to better mobilize ground troops with land vehicles. However, one of the most effective units in the fight against ISIS has been the Iraqi Special Forces, which does receive support from Iraqi Army helicopters for both transport and close air support (IISS 2016, 2017).

Overall, it is difficult to assess the combat application of Iraq’s military helicopter fleet. During most major combat engagements, the U.S. and other coalition forces have been present to help cover any shortcomings. Additionally, Iraq’s military has not been restricted by harsh terrain (like Colombia and Afghanistan) to the point where vertical airlift (i.e. non-attack) capabilities become a necessary alternative to ground transportation.

²⁸ Many of the primary attack helicopters were also acquired by Iraq after the U.S. had left and the training mission ended.

AFGHANISTAN

Country profile:

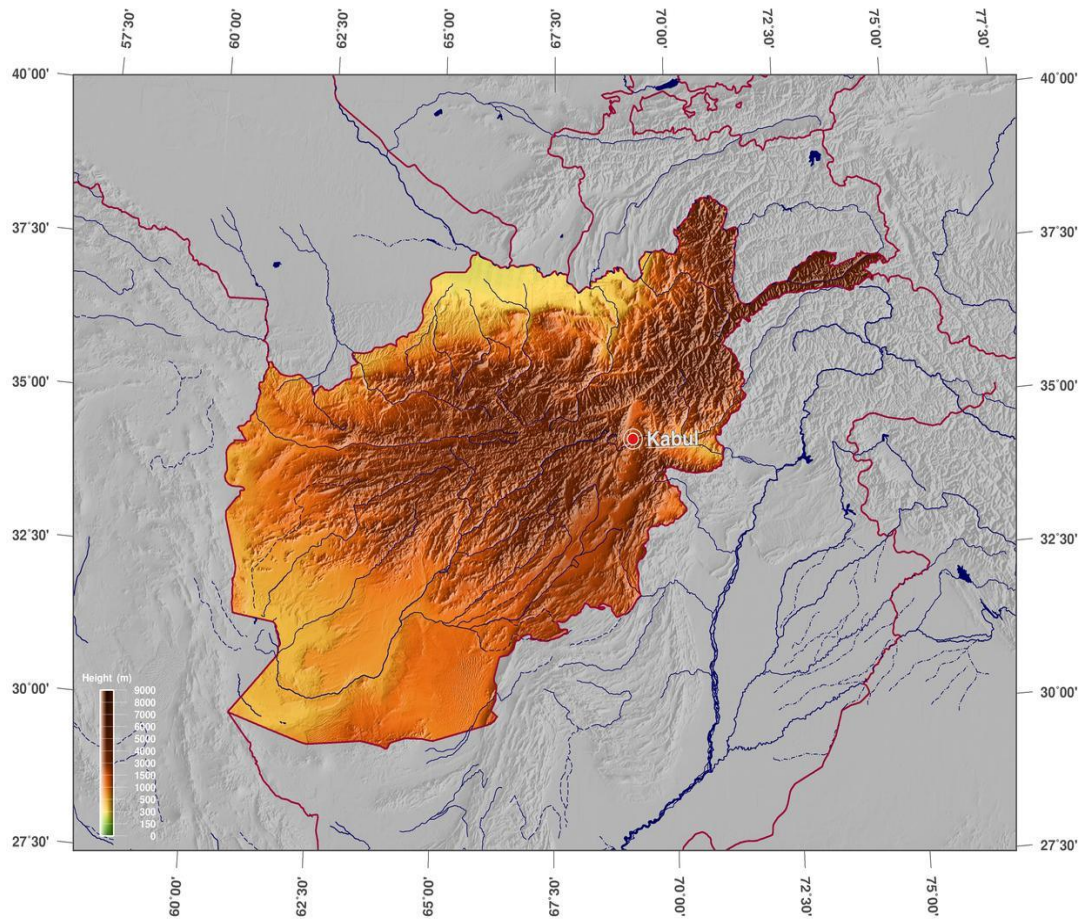
Afghanistan is located in southwest Asia to the east of Iran and north of Pakistan. The country is about 652,230 square kilometers, or “slightly smaller than Texas” (CIA 2017). Afghanistan consists of primarily rugged mountains with some plains areas in the north and southwest of the country. The average elevation in Afghanistan is 6,181 feet with peaks that reach a maximum of 24,557 feet. The climate in Afghanistan is “arid to semiarid” with cold winters and hot summers. A topographical map of Afghanistan is shown in Figure 4.

The literacy rate in Afghanistan is very poor. Of all adults, the literacy rate was 32% (2011) and 38% (2015) for the years available (UNESCO Institute for Statistics 2016). For these same years, people ages 15-24 had a slight improvement with 47% and 58%, respectively. The mean years of schooling in Afghanistan is also low, ranging from 2.6 in 2005 to 3.2 in 2014 (UNDP 2015).²⁹ On the Human Development Index, Afghanistan ranked 171 out of 188 with scores of .399 (2005) and .465 (2014)(UNDP 2015). Afghanistan’s Education Index rating was .301 (2005) and .365 (2014). Human capital remains a serious problem in Afghanistan, with very low health standards, high corruption, and “both capital flight and brain drain;” Afghanistan is “being left behind” despite huge amounts of foreign investments (Samin 2016).

²⁹ In contrast, the U.S. “mean years of schooling” was approximately 12.9 during this time (United Nations Development Programme 2015).

Figure 4. Topographical Map of Afghanistan

Afghanistan: shaded height and relief map



Map-license:
This map is licensed under the CC-BY-3.0 (<http://creativecommons.org/licenses/by/3.0/deed.en>). Please cite the GinkgoMaps-project and link back (<http://www.ginkgomaps.com>).

Parameter and used data:
Map Projection: Lambert (equal area); Map Center: lat 33.93°; lon 67.68°; vector data: Natural Earth (www.naturalearthdata.com) and GSHHG (www.seamless.com/user/profile/1234567890/); raster data: Geoware (www.geoware-online.com).

Afghanistan's economy is also poor; the GDP was 6.275 billion USD in 2005 and has since increase to 19.331 billion USD in 2015 (World Bank and OECD 2016). In the most recent edition of the *CIA World Factbook* (2017), the Afghan government's revenue was 1.7 billion USD, yet its expenditures were around 6.639 billion (a budget deficit of -

28.6% of GDP). Afghanistan's military spending was 4.74% of GDP in 2011 and increased to 28.09% in 2016 (CIA 2017). Overall, Afghanistan is "extremely poor, landlocked, and highly dependent on foreign aid," the ongoing conflict continues to challenge economic growth and contributes to Afghanistan having "living standards [that] are among the lowest in the world" (CIA 2017).

Security Landscape:

On September 11, 2001, the infamous terrorist attacks on the United States shocked the world. The U.S. government quickly discovered that the attacks were perpetrated by the Al-Qaeda terrorist organization, led by Osama Bin Laden and sheltered by the Taliban government in Afghanistan (CFR 2017). Operation Enduring Freedom began on October 7 with U.S. CIA and Special Forces teams working with the Northern Alliance to destroy Al-Qaeda and the Taliban. Conventional forces joined the fight twelve days later. During December of 2001, the Taliban surrendered Kabul and Kandahar, Osama bin Laden escaped into Pakistan, and the new Afghan government led by Hamid Karzai was established.

In 2002, President Bush called for the reconstruction of Afghanistan and Provincial Reconstruction Teams were established. In May of the next year, Secretary of Defense Donald Rumsfeld declared that "major combat" was over that there would be a shift from major combat operations to the reconstruction of Afghanistan. However, this did not mean an end to combat.

In May of 2005, Presidents Karzai and Bush reach an agreement to "help organize, train, equip, and sustain Afghan security forces as Afghanistan develops the

capacity to undertake this responsibility” (CFR 2017). By this point, the Afghan National Army reached a strength of 24,700 troops, although volunteerism was low and desertion was high as combat operations became increasingly intense (IISS 2005). In June, the well-known “Operation Red Wings” (made popular by the book and movie “Lone Survivor”) demonstrated “the Taliban’s continuing ability to carry out tactically sophisticated and coordinated operations” (IISS 2005, 226).

In 2006, violence increased across Afghanistan. This included the numbers of suicide attacks quintupling and remote detonated IEDs doubling. Instability persisted because of the continued Taliban insurgency, which was able to profit off high levels of opium production and large numbers of illegal weapons (IISS 2006). This led to some of the heaviest fighting between the Taliban and NATO and Afghan forces in 2007, which saw the international force in Afghanistan begin to look less like a reconstruction force and more like a counterinsurgency force. The fighting here also featured large uses of airpower by NATO. It is also important to note that at this time the National Intelligence Council³⁰ released a report stating that Al-Qaeda, based out of the federally administered tribal areas of Pakistan (bordering Afghanistan), was the greatest threat to the United States of America (Caldwell 2011).

In 2008, troops were still heavily engaged with counter insurgency operations against the Taliban while suicide attacks in the country continued to increase (IISS 2008). Although losing almost all direct military engagements, the Taliban increased its “areas of influence” from thirty districts in 2003 to 160 districts in 2008 (out of 364 total

³⁰The National Intelligence Council is an organization that “supports the Director of National Intelligence in his role as head of the Intelligence Community (IC) and is the IC’s center for long-term strategic analysis” (Office of the Director of National Intelligence).

districts)(IISS 2010, 344). In 2009, the Taliban continued to increase influence in areas that previously were not as violent and attacks across the country increased. In December of that year, President Obama announced plans to send approximately 30,000 additional troops to assist the 60,000-68,000 that were in the country in 2009 (CFR 2017; Caldwell 2011). This plan mirrored a successful strategic move used by President Bush called “the Surge” that was conducted in Iraq in 2007.

The overall security situation again worsened in 2010, with the highest number of NATO troops killed since 2001, but started to improve somewhat in 2011 with the build-up of troops (IISS 2011, 2012). ISAF’s ability to clear and hold areas had improved and NATO fatalities dropped, however civilian fatalities rose. The *International Institute for Strategic Studies* states that at this time NATO had “cautious optimism” (2012, 27), but because countries were continuously withdrawing troops, insurgents were likely going to “play the waiting game” (2011, 18).

In 2013, Afghan security forces took the lead in security responsibilities and the remaining U.S. troops started a shift towards military training and Special Operations counter-terrorism missions despite continued heavy fighting (CFR 2017). In 2014, Obama announced U.S. troops would be fully withdrawn by 2016 and only 9,800 would remain after 2014. In October, NATO formally ended its combat mission even though 2014 was called “the bloodiest year in Afghanistan since 2001” (British Broadcasting Corporation [BBC] 2017). There was also a request for U.S. aircraft to stay engaged given the Afghan Air Force had not achieved full capability yet (IISS 2014).

Operation Resolute Support started with around 12,000 troops remaining to help train Afghan forces, which included Obama delaying the withdrawal of US troops at the

request of Afghan President Ghani. In May of 2015, the Afghan government and the Taliban held informal peace talks, but the Taliban said they would refuse to stop fighting until all foreign troops leave the country. The year 2015 also featured the Taliban temporarily capturing the city of Kunduz, considered their “most significant advance since being forced from power in 2001” (BBC 2017).

In 2016, President Obama again extended the time before U.S. troops will withdraw until 2017. This year ISIS also became a security threat in Afghanistan, and in June U.S. forces were allowed to accompany Afghan forces in the field and use greater U.S. airpower (Sisk 2016). In its most recent report (released January 30, 2017), The Special Inspector General for Afghanistan Reconstruction (SIGAR) stated that the security situation has not improved. This included the number of Afghan security forces decreasing and both casualties and districts under Taliban control/influence increasing.

During the war in Afghanistan, the majority of helicopters shot down have been due to enemy small-arms fire and rocket-propelled grenades (Walsh 2010, Roggio 2016). However, there have been multiple instances where coalition helicopters have had missile warning systems activate and pilots reported witnessing surface-to-air missiles in use (Walsh 2010). By 2009, U.S. officials acknowledged that the Taliban has tried to use MANPADS (specifically, “SA-7 type IRSAMs”) to bring down helicopters (Grant 2010).

Building the Capacity:

Although the United States began full combat operations in 2001 and started rebuilding the Afghan National Defense and Security Forces (ANDSF) in 2002, there were no efforts to build any Afghan air capabilities until 2006 (Moroney et al. 2009).

This began in the fall of 2006 with a comprehensive survey conducted by the U.S. Air Force on the air power needs of the ANDSF. Actual building of air capabilities started in 2007 with the creation of the Afghan National Army Air Corps (ANAAC)(Nordland 2015).

Similar to the new foundation of the Iraqi Air Force, the ANAAC started with no real air capabilities whatsoever (Sisk 2013; Associated Press 2012). The Afghan air forces that were at their pinnacle in the 1980s during the Soviet occupation were left to rot under Taliban control and then completely destroyed during the U.S. invasion.³¹ The average age of the pilots that had previously been in Afghanistan's air force was about forty-five years old and most hadn't flown in over fifteen years (U.S. Air Force 2008; VOA 2010).

The U.S. recognized early on that the process of building an air force would be extremely difficult, even likened to "building an airplane in the middle of flight," but it was seen as a necessity for the ANDSF if it was to eventually take control for itself (House 2009; American Forces Press Service 2008). USAF Brigadier General Walter D. Givhan stated, "Air power is extremely important in this operational environment... It makes sense because of these rocky mountains, the lack of good roads or railroads, the forbidding terrain that covers much of the country and the threat of IEDs, that you should fly" (American Forces Press Service 2008).

From the beginning of this process, the goal was always to make the ANAAC (later becoming a separate branch, called the Afghan Air Force, or AAF) fully capable

³¹ It can also be noted that all of these aircraft were destroyed while still on the ground, none were destroyed in air-to-air combat.

and fully self-sustaining (Schwartz and Alberdeston 2007). Because this new capability had to be created from the ground up, it would include the tasks of “acquiring new aircraft, training pilots and mechanics, building new facilities, and creating a logistics sustainment system” (Schwartz and Alberdeston 2007). This task was given to the 438th Air Expeditionary Wing of the United States Air Force with the training mission scheduled to last until 2016. Nevertheless, they are still in Afghanistan and likely will be for some time.

One of the first steps in creating the ANAAC was re-certifying “legacy” pilots on platforms they were familiar with (US Forces Afghanistan 2008). Partly for this reason, older Soviet era helicopters (the Mi-35 and Mi-17) were chosen as the first platforms to be added to the Afghan fleet (US Forces Afghanistan 2008; House 2009). Additionally, USAF Captain Chris Tooman stated that these Soviet platforms were “Extremely reliable, we have very few issues with them, they’re perfect for this type of environment” (VOA 2010). However, the U.S. Department of Defense (2008) stated that it would begin looking for replacement options very soon.

In addition to acquiring aircraft and retraining old pilots, USAF began making contracts to create a logistics and sustainment system, establish schools, and rebuild air force infrastructure. Before flight and specialty schools were established, new pilots were sent to the U.S. for flight training³² and mechanics and support personnel did on-the-job training with USAF personnel (US Air Force 2008). Raytheon was hired to establish flight schools for the AAF, which were put in place in 2010, but only started reaching full

³² After receiving English language training, which often took over a year for recruits to complete.

capacity in 2016 (Seck 2016). It was also not until 2012 that the first phase of Afghan flight training was able to take place entirely in Afghanistan (Moore 2012).

In 2008, the ANAAC started with six Mi-35s and seven Mi-17s (IISS 2008). By 2011, this had increased to nine Mi-35s and twenty-seven Mi-17s (IISS 2011). Later that year the U.S. started to acquire the American-made MD-530F. The selection of this aircraft was initially controversial with “legacy” pilots, who accused the aircraft of being not powerful enough to operate in Afghanistan’s harsh terrain.³³ However, USAF justified this decision because it was a light attack platform that was much cheaper and simpler to fly and repair than the Mi-35 and it had appropriate attack capabilities given the intended targets were “guys with a gun in the back of a pickup truck” (Nordland 2015). Additionally, this acquisition was also meant to bridge the gap for close air support capabilities while the AAF transitioned its primary attack capability from the Mi-35 (scheduled for retirement) to the fixed wing A-29 Super Tucano (SIGAR 2016).³⁴

By the end of the U.S. and ISAF combat mission in December 2014, the AAF’s helicopter fleet had grown to five Mi-35s, six MD-530Fs and seventy-two Mi-17s (IISS 2015).³⁵ The entirety of the AAF had just under 7,000 personnel, including 131 fully trained pilots (with an additional seventy-six pilots with the Special Mission Wing)(Cordesman 2014).³⁶ During this time, the AAF took the lead in providing all applications of airpower in support of the fighting in Afghanistan when the U.S. combat

³³ Nordland (2015) also stated that among the new, non-“legacy” pilots the acquisition of this aircraft was popularly supported and well-received.

³⁴ Up until the introduction of the A-29, all AAF attack capabilities were from rotary wing assets.

³⁵ This includes 30 Mi-17 helicopters that were part of the Special Mission Wing (SMW), an organization tasked with flying for and supporting the Afghan Special Forces and counter-terrorism units. Most information about this unit is classified.

³⁶ The number of pilots represents both fixed and rotary wing pilots, although the SMW pilots are almost entirely rotary wing pilots.

mission ended (Smith and Harooni 2016). The U.S. training mission still continued and the 438th AEW continued the process of building the AAF. As of the most recent SIGAR report (2017), the AAF has forty-six Mi-17s (not including those of the SMW), twenty-seven MD-530Fs, and three Mi-35s. The initial 2016 deadline to build the AAF was missed, and they are “still far from fully capable, let alone self-sustaining” (Sopko 2016). In terms of cost, the U.S. alone has spent over \$6.5 billion to develop the AAF, with additional significant contributions from other countries as well (SIGAR 2015).³⁷ This includes the U.S. donating or purchasing the majority of its aircraft (including all fixed wing, all MD-530Fs, and thirty-three Mi-17s; most other helicopters were donated by the Czech Republic)(SIGAR 2016).

Although the U.S. has made progress in building the AAF, there have been major challenges to this process. Most of these challenges have been related to human capital, which is directly cited by USAF (TAAC-Air 2017). One of the primary problems here is illiteracy. According to USAF Colonel Michael T. Needham, “about 85 percent of our current recruits are illiterate – and that’s on a good day” (Associated Press 2012). This has led to large increases in the time it takes to train pilots and mechanics and has made it extremely difficult to recruit personnel (Moroney et al. 2009; Associated Press 2012; Smith and Harooni 2016). As of today, there is a large shortage of pilots and aircraft maintenance is falling behind operational demand. Additionally, U.S. contractors are still required to perform 80 percent of aircraft maintenance while AAF maintainers only perform 20 percent (TAAC-Air 2017).

³⁷ This number is from the data available from SIGAR during FY2010-2014, total data was not available to them before 2010. This number also represents the cost for the entire Afghan Air Force, although the majority of its fleet consists of helicopters (SIGAR 2015).

The AAF has struggled with retaining pilots, as people with English proficiency are in high demand in Afghanistan (Moroney et al. 2009). It is also common to have an AWOL rate in the AAF of around 20% (Druzin 2012). AAF personnel have also been accused of transporting narcotics using AAF aircraft and nepotism and corruption have been cited as frequent problems (Georgy 2012, Druzin 2012). Lastly, a two-decade veteran and AAF Colonel by the name of Ahmed Gul executed nine USAF personnel in an attack in 2011 that had no connections to the Taliban or any terrorist organization (Pawlyk 2016).

Application of the Capacity:

When the ANAAC started in 2007, it had very few capabilities and was not able to contribute in significant ways to the fight. It was also not until May of 2009 that the Mi-35 made its first flight with Afghans at full flight controls (Pike 2015).

When assessing the application of the ANAAC/AAF to the war in Afghanistan, it is very important to note that until the end of 2014 the U.S. was still heavily involved in combat operations that included the use of aircraft. This is important in that it could cover up any of the serious faults of the AAF, which “did not become critical until the [U.S.] and coalition turned over fighting to Afghans in 2013-2014” (Collins 2017, 2). During this time, however, it was noted by Major General Joseph McConville in 2013 that the AAF had greatly improved its capabilities when it came to transporting troops and MEDEVAC, although close air support was still a challenge for them (Sisk 2013).

Once the U.S. ended its combat mission, the ANDSF took responsibility for the security situation. This included the AAF taking over primary responsibility for air

missions to support the war, although U.S. aircraft have continued to provide some air support, but in a more limited capacity (Smith 2016). Since this time, there have been some serious shortcomings in the AAF's ability to assist the ANDSF.

One of the primary problems is that the AAF does not have enough pilots and crews to operate all its aircraft. Afghan Major General Abdul Wahab Wardak stated that the number of aircraft the AAF possesses is simply not enough to keep up with the demand and the fact that there are not enough pilots to operate the entire fleet only makes it worse (Smith and Harooni 2016). The lack of aircrews has caused extreme pressure on the aircrews that are available and often times they are flying many more hours than they should and are "becoming exhausted" (Smith and Harooni 2016). Maintenance has also been an issue within the helicopter fleet. In 2015, there was only one of the five Mi-35s that was combat capable and a lack of spare parts and maintenance caused constant problems keeping the Mi-17s in serviceable condition (Nordland 2015). The Mi-17 fleet is also reaching its service age limit and the "will become unsustainable by mid-2018" (Marty 2017).

Aside from the supply of AAF aircraft crews not being able to keep up with the demand, close air support has been another serious problem for the AAF. One of the first problems here is that there is a reported shortage, with ANA troops "crying out for more air support" (Smith and Harooni 2016). Even Mi-17s used for transport have been fitted with forward-firing weapons to make them capable of air support and fire missions, despite further limiting the number that can now be used for transport missions (Marty 2017). The lack of air support has put serious pressure on ground troops, who likely had become too dependent on close air support previously provided by the U.S.

(Schogol 2015; Nordland 2015). Another problem with the AAF's close air support is the high likelihood for civilian casualties. In 2016, the number of civilian casualties caused by AAF airstrikes had doubled from the previous year, primarily caused by the MD-530F (Snow and deGrandpre 2017).³⁸

Overall, the AAF and their helicopter fleet have been considered crucial to the fight against the Taliban, yet also are facing serious problems in their combat application (SIGAR 2016). The amount of air support given by the AAF is not enough and of low quality and aircraft are unable to meet the high demands of the ANDSF. While the performance of the AAF is in no way the only factor determining the combat successes and failures of the ANDSF, the application of airpower is still a vital component that has not been performing to the degree required to defeat the Taliban and improve the security situation in Afghanistan.

Hypotheses:

In the following section, I will present hypotheses for how the five factors I have chosen to focus on influenced the capacity-building process and the military effectiveness of the new capabilities. These hypotheses will be based upon the three previous cases and supported by evidence where one or more factors clearly influenced the helicopter capacity-building mission. Each factor will get its own subsection. Additionally, a

³⁸ The vast majority of which were caused by MD-530F, which primarily conducts Close Air Support missions, while the A-29 primarily conducts fire missions on pre-selected targets.

summary table of the conditions present in each case and the results of the helicopter capacity-building missions are displayed in Table 1.

Table 1. Summary of Case Information

CONDITIONS			
	Colombia	Iraq	Afghanistan
Perceived Threat	Low/Medium	High	Extreme
Advanced Enemy Countermeasures	Absent/low	High	Medium
Terrain	Fair, Restrictive	Favorable, Unrestricted	Unfavorable, Restrictive
Economic Conditions	Good	Good	Extremely Poor
National Human Capital	Average	Slightly Below Average	Extremely Poor
RESULTS			
	Colombia	Iraq	Afghanistan
Growth	Fast, Continued	Fast, Continued	Slow, N/A
Quality	High	Medium	Low
Effectiveness	High	Inconclusive	Low

Level of Threat to the U.S.

The level of threat to the United States appears to have dictated the amount the U.S. was willing to invest in building capacity. The United States made it known that its greatest threat was from Al-Qaeda near the border of Afghanistan (and previously

sheltered by the insurgency the Afghanistan government was fighting). Accordingly, the U.S. also spent the largest amount of money developing the Afghan Air Force and its helicopter fleet out of the three cases. Additionally, in Colombia, it was not until NSPD-18 that PCHP helicopters were able to take on FARC targets. This showed that once the U.S. considered the FARC a more direct threat by labeling it a terrorist organization, the U.S. authorized its investment in the Colombian helicopter fleet to be utilized in a more extensive manner.

The level of threat to the U.S. did not, however, dictate how well a helicopter fleet was able to grow or be utilized. As seen in Colombia, the PCHP was initially given only to combat the production and exportation of narcotics, arguably less of a threat than the case in Afghanistan or Iraq. However, this case was the most effective instance of the three where the U.S. was able to build a high-quality, large, and effective military helicopter fleet that played a crucial and positive role in the military campaign against the FARC. On the opposite side, the case in Afghanistan saw the largest threat to the U.S. and the largest investment, yet the building of the AAF has been the least successful instance of the three cases in terms of growth and effectiveness.

Presence of Enemy Countermeasures

The threat of advanced enemy countermeasures is difficult to determine given the exact defensive capabilities (i.e. flares, chaff, missile detection warning systems) of the helicopters in each specific fleet is often classified. However, from what we can learn about this, it did appear that this factor has a small amount of influence.

In Colombia, the FARC did not possess MANPADS until 2012, yet the Colombian military received an advanced fleet of modern American-made helicopters. In Iraq, where the situation with advanced enemy countermeasures was much more severe, its fleet consisted of some of the same helicopters (i.e. Huey IIs), but did not receive American UH-60L Blackhawks and instead acquired older Soviet Mi-17s.

In terms of the influence this factor did have, Iraq did acquire much more advanced versions of the Mi-17 (Mi-171sh and Mi-17MM) later in the building process. It is unknown if these upgraded versions were specifically for helicopter survivability reasons or if there were other factors at play. Additionally, as part of the justification for the AAF acquiring the MD-530F, USAF Lieutenant Colonel James Abbott stated, “You’re fighting guys with a gun in the back of a pickup truck: How much technology does that need?” (Nordland 2015). This is possibly in reference to the MD-530F being a suitable platform given it was not intended to go up against a highly advanced enemy that possessed advanced countermeasures.

Overall, this factor is difficult to determine due to the classified nature of helicopters defensive measures. Nevertheless, the presence of advanced enemy countermeasures has a small amount of impact on aircraft selection, but not much else on the building process. In terms of combat application, it did not appear that the possession of enemy countermeasures played a substantial role in determining the effectiveness of newly built helicopter capabilities.

Terrain

Terrain, as it relates to affecting flight performance of helicopters, did not have much influence. Afghanistan had the most restrictive terrain when it came to altitude, terrain features, and heat (especially during the fighting season in the summer, when combat activity is highest). Despite this, the AAF's helicopters were not the most advanced, as can be seen by the Mi-35 (well equipped for Afghan terrain) being phased out and replaced by the much smaller MD-530F, which has a smaller range and is less powerful (Nordland 2015). Additionally, Iraq's terrain was much lower altitude, yet its helicopter fleet acquired more powerful and advanced versions of the Mi-17 than the AAF. Colombia also had a more powerful fleet of helicopters even with a lower average altitude. Given these instances, I would suggest that terrain, as it relates to affecting flight characteristics, does not have much influence in determining the type and quality of aircraft that are acquired in the building process.

On the other hand, terrain had a large effect when it came to restricting the movement of soldiers on the ground, making the use of helicopters very effective in a military campaign. Evidence of this is most notable when comparing the cases of Iraq and Colombia. In Colombia, the military was much better equipped to take on the FARC because of the air mobility added by helicopters. This allowed soldiers to insert, extract, receive MEDEVAC and CAS, and occupy territories that were previously very difficult to access (Zaltzman 2015). This gave them greater presence across the country and allowed them to be bolder in their offensives. The ability to move quickly over harsh and restrictive terrain is what gave the Colombian military "asymmetric dominance" over the FARC (Zaltzman 2015, 1). In Iraq, where most of the terrain is flat, the use of helicopter

transport has not been as widespread and most operations against ISIS have used ground transportation for the larger deployments of combat troops (IISS 2017). However, Iraq has used helicopters effectively for attack and close air support reasons. Therefore, I would suggest that the more restrictive the terrain, the more important and effective helicopter capabilities will be to a military campaign.

Economic Conditions

The economic conditions of a country appear to influence capacity-building missions in multiple ways. The first, which may seem rather obvious, is that it dictates how much the U.S. must invest to achieve certain fleet sizes. This can be seen in Iraq and Afghanistan, where the entire air force (including helicopters) had to be built from the ground up. In Afghanistan, the U.S. and coalition partners have donated and paid for the vast majority of all ANAAC/AAF expenditures, leading to a much larger overall price for the capabilities that were built. In Iraq, where the government is able to generate a large amount of revenue through the sale of oil, the government was able to purchase many of its aircraft with its money. It is also possible that for this reason the IqAF was given more autonomy in its growth as a force.³⁹

Economic conditions also appear to have a direct effect on the platforms that are acquired. One of the primary concerns of capacity building is that the capacity is sustainable so the U.S. can withdraw and transfer the costs to the new owner. In Iraq and

³⁹ This was directly cited by the U.S. when USAF officials said they would focus more on “focus on presenting options to the new service, not directing its growth” (Ovel 2005). As opposed to Afghanistan, where senior AAF members did not support the acquisition of the MD-530F, but the U.S. went ahead anyways (Nordland 2015).

Colombia, where the governments have much higher revenue, newer, more expensive, and technologically sophisticated helicopters were acquired than those used in Afghanistan. Additionally, part of the reason the Mi-35 was phased out and replaced with the smaller and less-equipped MD-530F was concern over the cost to fly and maintain it (Nordland 2015).⁴⁰

Lastly, economic conditions affected future growth. In the cases of Iraq and Colombia, both were able to continue purchasing additional helicopters without U.S. assistance and grow their fleet. It is unknown whether this will happen in Afghanistan; it is, however, extremely unlikely given that the AAF will likely require financial assistance maintaining its current fleet even after the U.S eventually leaves.

National Human Capital

National human capital appears to be one of the most important factors in determining the effectiveness of the building process. Human capital was directly cited by the United States Air Force as one of the main challenges with building the Afghan Air Force (TAAC-Air 2017). This has become evident due to difficulties recruiting and training pilots and maintainers that has led to a severe shortage of pilots and available aircraft that are not able to meet the demand of the ANDSF. Of the other cases, Colombia had the highest rating of human capital and was able to develop the highest quality helicopter program that now even trains pilots from other countries.

⁴⁰ Another important factor in this decision was human capital related, in that it was easier to train mechanics to maintain the MD-530F than the Mi-35.

Additionally, human capital, in conjunction with economic conditions, appears to influence the platforms that comprise the helicopter fleet. Aside from concerns over cost, the Mi-35 was also replaced by the MD-530F because it was easier for Afghan mechanics to maintain and easier to train pilots how to operate (Nordland 2015). While the complexity and technological sophistication of helicopter platforms were made simpler to meet the requirements of the Afghan Air Force, the Iraqi Air Force was able to acquire more sophisticated aircraft that better fit its abilities. The type and abilities of helicopter platforms are especially important, as they can directly impact the effectiveness of the entire fleet.

Overall, while all the factors appear to have had some influence, human capital was the most influential in determining the effectiveness of U.S. efforts to build helicopter capacity.

Conclusion:

On the modern battlefield, helicopters can provide military forces significant tactical advantages over insurgent forces with lesser capabilities. This added advantage can enable a partner government to take better control over its internal security and assist in eliminating transnational threats. Building the capacity of a foreign government can therefore increase U.S. security while also allowing the U.S. to focus our attention and resources elsewhere. However, the process of building helicopter capacity can be complex, costly, and lengthy.

For U.S. strategy going forward, the hypotheses I presented in this paper can help give a glimpse at what a helicopter capacity-building mission would look like based on the conditions of the five factors in a country of interest. Unfortunately, many countries that have internal security problems and harbor transnational threats are often those that score poorly in terms of national human capital and economic conditions (Rice 2005). Both of these factors have a substantial influence on helicopter capacity-building missions and can severely limit the growth, sustainability, and effectiveness of a helicopter force.

Given the complex and expensive nature of this capability, I would recommend that the U.S. only embark on a helicopter capacity-building mission in a country of low human capital and poor economic conditions when there is a significant tactical advantage (such as restrictive terrain) to the possession of helicopters. Otherwise, it may be more advantageous to invest in other, more sustainable, capabilities that can provide troops mobility and firepower. However, when there is a threat serious to the United States and helicopters can help provide a significant tactical advantage to a country capable of effectively using them, it is definitely in the U.S. interest to invest in building helicopter capacity.

APPENDIX 1: Information on Helicopter Platforms

AIRCRAFT SPECIFICATIONS ¹					
Aircraft	Manufacturer	Manufacturer Country of Origin	Type	NATO Reporting Name	Approximate Unit Cost ² (Millions USD)
UH-60	Sikorsky	USA	Multirole-Medium	“Blackhawk”	8.6
UH-1N	Bell ³	USA	Twin Turbine Utility	“Iroquois”	5
UH-1H	Bell	USA	Multi-Mission	“Huey II”	
OH-58	Bell	USA	Armed Observation	“Kiowa”	4.9
206B3	Bell	USA	Light Utility	“Jet Ranger III”	
T407	Bell	USA	Light Utility		1.37
MD-530F	McDonnell-Douglas	USA	Light Utility Single Engine	“Cayuse Warrior”	1.5
Mi-17	MIL	Russia	Multirole-Medium	“Hip”	9.2 - 10.9
Mi-171	MIL	Russia	Multirole-Medium	“Hip”	9.2 - 10.9
Mi-35	MIL	Russia	Attack	“Hind”	
Mi-28	MIL	Russia	Attack	“Havoc”	12
SA-342	Aerospatiale	France	Light Utility	“Gazelle”	
H135M	Eurocopter/Airbus	UK	Light Utility Twin Engine		5.15

¹ This table is designed to provide basic information on the helicopter platforms previously referenced. This table is not meant to be used as a comprehensive comparison of the aircraft selected given there are a variety of important features not addressed (i.e. avionics systems, cost per flight hour, defensive capabilities, and possible weapons systems). Information was gathered in as uniform a manner as possible; however, some performance measures vary slightly in how they were conducted from aircraft to aircraft (i.e. different altitudes and temperatures, IGE/OGF, with or without fuel reserves, and/or Max/standard AUW)

² These numbers represent sales for new helicopters direct from the manufacturer, although many of the helicopters donated or procured in the cases were used helicopters with varying years of previous service. Unit costs can also vary significantly depending on the exact model, configuration, and systems of the specific aircraft being procured. Prices are not adjusted for inflation.

³ Bell Helicopters (owned by Textron) is an American helicopter manufacturing company based out of Texas. This company manufactures aircraft both in the United States and Canada. Aircraft from this chart produced in Canada include the 206B3, T407, and later production of the UH-1N.

AIRCRAFT SPECIFICATIONS (cont.)						
Aircraft	Service Ceiling	Hover Ceiling	Range	Payload	Max Cruising Speed	Source
UH-60	19,140 ft	10,400 ft	363 miles	2,640 lbs	159 kts	IHS Jane's 1999
UH-1N	13,000 ft	8,600 ft	284 miles	4,847 lbs	100 kts	IHS Jane's 1999
UH-1H	16,210 ft	12,595 ft	284 miles	4,873 lbs	106 kts	Bell Helicopters 2016
OH-58	15,000 ft	6,900 ft	308 miles	2,200 lbs	114 kts	IHS Jane's 2001
206B3	13,500 ft	5,300 ft	430 miles	1,490 lbs	115 kts	IHS Jane's 2006
T407	20,000 ft	10,450 ft	379 miles	2,585 lbs	133 kts	IHS Jane's 2006
MD-530F	18,700 ft	11,600 ft	267 miles	1,510 lbs	135 kts	IHS Jane's 2011
Mi-17	15,740 ft	13,055 ft	289 miles	8,820 lbs	135 kts	IHS Jane's 2011
Mi-171	18,700 ft	13,055 ft	385 miles	8,820 lbs	124 kts	IHS Jane's 2011
Mi-35	14,750 ft	4,920 ft	310 miles	8,377 lbs	145 kts	IHS Jane's 1992
Mi-28	18,700 ft	11,820 ft	270 miles	44,090 lbs	145 kts	IHS Jane's 2011
SA-342	16,404	9,973 ft	456 miles	1,653 lbs	140 kts	Pike 1999
H135M	9600 ft	6000 ft	394 miles	3,042 lbs	138 kts	IHS Jane's 2011

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