Memorandum
To: National Security Advisor

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MS&E 193: Technology and National Security
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Instructor Foreword

In the capstone assignment for my course “Technology and National Security,” Andrew Milich’s superb policy paper demonstrates clarity of thought, rigorous research and analysis, and cogent argumentation. The policy paper provides a recommendation to the U.S. National Security Advisor in favor of one of two courses of action to respond to an international security crisis. This year, students were given a scenario in which ISIL has stockpiled chemical and radiological weapons and intends to use them in an imminent attack.

Andrew’s final paper recommends that the President of the United States resolve the ISIL threat by launching an airstrike to destroy the stockpile. Andrew develops his argument for the airstrike option by marshaling an extensive body of scholarly research. He deftly guides the reader through this argument by employing logical organizing principles, a quantitative decision tree and careful, focused language. Andrew concisely describes the pros and cons of the two alternatives, drawing on historical evidence, technical considerations, and a straightforward and nuanced analysis. His paper meets the high standards of professionalism, clarity, and formality required of policy writing, and it makes a compelling case worthy of a real policy memo in the National Security Council.

—Siegfried S. Hecker
Executive Summary

Intelligence indicates that the Islamic State of Iraq and the Levant (ISIL) has acquired chemical and radiological weapons that they intend to smuggle into Europe or use on a nearby Shia refugee camp. Although ISIL once tightly controlled the region surrounding the Al-Tabqa airbase believed to house the weapons, Russian Spetsnaz and Syrian government forces have recaptured territory only kilometers away. The intelligence community predicts the weapons will be used in one week. The United States (US) may respond with one of two options: an airstrike on the Al-Tabqa airbase, or diplomatic outreach to Russia to coordinate a joint raid on the compound with Spetsnaz. The President should immediately order an airstrike as it eliminates the possibility of a devastating terrorist attack in Europe, better protects US and NATO interests in the region, and avoids implicitly accepting Russia’s actions in Syria.
The acquisition of chemical and radiological weapons by ISIL presents a significant threat to regional and global security. Intelligence provided by a former ISIL fighter suggests the group has acquired sarin gas munitions and a Cesium-137 (Cs-137) radiological dispersal device. Both could be used in a mass-casualty terrorist attack on a European capital or in refugee camps along the Syria-Turkey and Syria-Iraq borders, which currently shelter millions of displaced civilians. Sarin gas, classified as a weapon of mass destruction (WMD) by the Chemical Weapons Convention (CWC), has been used to devastating effect by Bashar al-Assad’s regime [7]. As Russian and Syrian government troops have re-taken territory surrounding the airbase, the weapons will likely be moved in one week, another risk that must be considered. Any US response must overcome additional security and political risks, including Russian troops and anti-air missile defense. Ultimately, while Russian and Syrian government forces are less concerned with incurring civilian casualties, the US must balance a mission to protect civilians with a responsibility to avoid the economic and political costs of a terror attack in Europe.

Background Information

Critical considerations for each course of action include the presence of the Russian military in Syria, the expanding population of refugees, and the increasing risk of terror attacks both in Syria and abroad. The Syrian Civil War, precipitated by internal unrest in 2011 and exacerbated by insurgent groups, has claimed over 400,000 lives and displaced almost ten million civilians [6]. The conflict has expanded to include a variety of terrorist and insurgent groups, such as ISIL and the Al-Qaeda backed Al-Nusra front. Ideologically, ISIL has espoused a doctrine of brutal violence, exemplified by recent terrorist attacks in Lebanon and Paris [6]. Thus, though ISIL’s presence in Iraq has been eroded in recent months, affiliated terrorist cells may continue to conduct devastating attacks.
The Syrian conflict has evolved into a limited “proxy war” between the US and Russia. Since 2014, the US has led an international coalition that has conducted thousands of airstrikes against ISIL. Although a Department of Defense program to train and equip opposition groups ended in late 2015, the CIA has supported specific factions with anti-tank weapons and other equipment [14]. In late 2016, US special operations personnel were deployed to train and assist Turkish troops, Kurdish fighters, and the Syrian Democratic Front (SDF) [4]. US allies in the region, including Saudi Arabia and Jordan, have aided in efforts to train and equip rebels, further complicating regional politics. Russia has sought a more active role in bolstering the Assad regime [14]. While US forces have primarily joined Syrian opposition forces to train and assist, Russian troops have played a key tactical role on the battlefield in planning and executing missions. Russian bombers, staged in Iran, and warships from Russia’s base in the Syrian port of Tartus also have entered the conflict. Though rebels occupied Syrian government territory in late 2015, government forces, amplified by Russian firepower, have recently besieged Aleppo and retaken holdings. Furthermore, Russia has deployed the S-400 Triumph surface-to-air missile system, inhibiting US operations against Syrian government forces. Recently, an accidental airstrike by US fighters on Syrian government forces and failed attempts to coordinate attacks prompted former Secretary of State John Kerry to end talks with Russia about Syria [16, 17].

The scientific ramifications of chemical and radiation weapons prompt further consideration. Sarin gas – a colorless and odorless nerve agent – can be delivered by artillery shells or airstrikes and easily contaminates air and water. In 1995, liquid sarin was used in a domestic terrorist attack on a Japanese subway; small quantities of sarin, which quickly evaporated, caused twelve deaths and over a thousand injuries [5]. United Nations (UN) observers have found that chemical weapons, including sarin, were used by Assad’s forces to a deadly effect in Ghouta, a suburb of Damascus, and on at least four other occasions [7]. In 2013, Assad agreed to destroy his stockpile of chemical weapons. Though banned under the CWC, chlorine
gas continues to be used by insurgents and government forces [19]. Given two pallets of chemical munitions, ISIL could cause significant physiological harm to thousands of civilians in the form of a sarin attack on a crowded refugee camp or European city.

Though exposure to the gamma and beta radiation emitted by a Cs-137 RDD can induce poisoning or death, it is unlikely to produce high civilian casualties as range and exposure are limited [15, 20]. With a 30-year half-life, the Cs-137 in an RDD could contaminate a few square kilometers of a city center and cause psychological and economic impact on a scale similar to the 9/11 attacks [2]. Facing advancing troops near Al-Raqqa, ISIL may seek to regain momentum by relying upon their known tactic of violent civilian attacks. Refugee camps, which house tens of thousands of civilians, represent potential targets of a large scale terrorist attack [6, 7].

**Policy Alternatives**

The President has been presented with two courses of action. He seeks to minimize the expected number of civilian lives lost. The Secretary of Defense proposes deploying B-2 stealth bombers and F-22 fighters to penetrate Russian air defenses and drop 30,000 pound GBU-57 bombs on the bunker believed to contain the chemical and radiological weapons (Option A). The Secretary of State has suggested sharing intelligence with Russia in order to conduct a joint raid to identify and disable the bunker (Option B). Appendix A provides a summary of the probabilities and expected casualties for each outcome.

**Policy Analysis**

The expected value of the decision tree (Appendix A) indicates Option A minimizes the expected number of civilian lives lost to 3,100, compared to 3,360 lives lost for Option B. Yet, the policy recommendation from the decision analysis is not robust. The optimal decision changes within a sensitivity range of seven percent for the probability that Russia agrees to conduct a joint operation (Appendix B), four percent for the probability that US forces are able to locate the correct bunker and pen-
erstrate Russian defenses (Appendix C), and five percent for the probability ISIL chooses to attack Europe (Appendix D). Thus, although sensitivity analysis demonstrates that Option A’s optimality in the decision tree is not quantitatively robust, qualitative factors provide more insightful considerations and definitive support.

Option A prevents the possibility of a terrorist attack on Europe, the most economically and diplomatically costly outcome. A chemical or radiological attack in a European capital could prompt catastrophic economic effects and undermine confidence in European governments. As the expected number of lives lost in such an attack is 8,000 (almost three times the scale of 9/11), significant political upheaval could follow, including a shift towards right-wing populism and authoritarianism [11]. This could compound the economic consequences of an attack by fostering political upheaval throughout Europe. An RDD, known as a “weapon of mass disruption” could significantly upset access to a major economic center, particularly if used in conjunction with a deadly chemical attack [8, 10]. Unlike Option B, which could result in the US taking no military action, Option A clearly signals to ISIL that the US will actively pursue deterrence by denial in proactively combatting any radiological or chemical threat, thus establishing the President as a decisive force against terrorism [12]. As security concerns in Europe have escalated since the start of the Syrian conflict, an airstrike would be perceived by US allies as a necessary and proportionate response to the danger posed by chemical and radiological weapons. If an airstrike is unsuccessful, and ISIL chooses to perform an attack, the decision analysis suggests ISIL will only use the weapons against refugees in Iraq, Syria, or Turkey (Appendix A), which could prompt anti-ISIL sentiment. Although an attack on Shia civilians by ISIL, a potential outcome of both options, could prompt Sunni support for the group, these benefits would be significantly more limited than those of an attack in Europe [6].

Disadvantages of Option A include the potential of triggering an accidental release of radiation or chemicals and escalating US-Russian hostility. As Russian forces are deployed only kilometers from the Al-
Tabqa airbase, US aircraft would be required to overfly Russian anti-air defenses. Even if the bombing operation were successful, a diplomatic confrontation with Russia could ensue, particularly since US forces accidentally targeted Syrian government troops in late 2016 [17]. If Option A is unsuccessful, however, the release of chemicals and radiation into the area could kill Russian or Syrian government forces, representing a major setback to US-Russian relations that could intensify the opposition between the US and Russia in Syria. Yet, even in this scenario, the weapons would be disabled and unusable by ISIL in a larger scale attack. An unsuccessful airstrike, which may cause thousands of civilian casualties in the region, could also serve as propaganda for ISIL or Syrian government forces. As a result, future US operations against ISIL in the area would become significantly more difficult, as US aircraft or special operations forces may be directly targeted by Russian defenses. In addition to negative political consequences in Syria, a greater schism in Russian relations could significantly impact other US diplomatic initiatives, such as nuclear disarmament or the ongoing conflict in Ukraine. As in the 2013 initiative to destroy Assad’s chemical weapons, Russia will play a central role in brokering any peace agreements in Syria [19]. Thus, Option A, whether successful or unsuccessful, could make future operations against ISIL or aspirations for peace difficult to realize.

At the outset of a new presidency, Option B presents the possibility of resetting US-Russian relations in Syria, perhaps presaging a more unified attempt to establish peace in the region. US and Russian interests align in fighting extremist Salafi terrorism, particularly after ISIL terrorists used a bomb to destroy a Russian airliner in 2015 [13]. Option B avoids the possibility of a military confrontation between the US and Russia; if successful, Option B could restart discussions of coordinating anti-ISIL airstrikes and intelligence or establishing a ceasefire. As experts generally agree that ISIL is structured for resilience and can operate as independent terrorist cells, Russian Spetsnaz troops could be valuable partners in fighting the group [6, 9].
Option B also presents multiple disadvantages, including implicit acceptance of Russian involvement in Syria and the possibility of conducting no military response. Although Russia will inevitably play a role in fostering peace in the region, Putin has refused to hold Assad accountable for targeting civilians [14]. If the US conducts a joint operation with Russia in Syria, it could legitimize Putin’s actions and discredit US opposition towards Assad. Although US and Russian interests align in fighting ISIL, Russia intends to reestablish Assad’s regime while the US seeks a highly different outcome. Thus, Option B’s potential rewards in improving US-Russian relations may be short-lived. Option B’s greatest shortfall is its reliance on a foreign actor – President Putin – to determine whether the US will act. If Putin delays negotiations or takes more than one week to respond (which is the more likely outcome if Option B is chosen), the US will have waited too long to act, a scenario which would prompt serious diplomatic repercussions with European allies if publicized. In this scenario, pursuing Option B could result in a terrorist attack in Europe that could kill thousands of civilians, a propaganda victory for ISIL that could motivate more foreign fighters to join their cause. From a security perspective, Option A, which could cause an equally tragic attack on a nearby refugee camp, would be less destabilizing to global politics and security. Thus, although Option B may temporarily improve US-Russian collaboration in Syria, it presents costly dangers and ephemeral benefits.

**Recommendation**

Option A takes the necessary preventative action in order to definitively thwart a terrorist attack in Europe while signaling US commitment to eradicating chemical and radiological weapons. In contrast, Option B does not adequately respond to the threat posed by ISIL as it relies on quickly establishing collaborative diplomatic relations with Russia and may result in the US taking no action in response. Furthermore, as pursuing Option B could convey an acceptance of Russian military presence in the region, it undermines US interests in ultimately toppling Assad’s regime. Thus, Option A is a necessary and proportionate response to the security threat posed by ISIL.
Appendix A
Decision Criteria and Tree

Problem: Decision Problem: Should the US conduct an airstrike against Al-Tabqa or coordinate a joint raid with Russia?
Decision Criteria: Minimize civilian casualties

Assumptions: U.S. President is risk neutral, wants to minimize civilian casualties

Inputs: Initial Outcome of Decision
0.7 Probability that airstrike will successfully locate bunker and penetrate anti-aircraft defense
0.4 Probability that Russia agrees to a joint special forces operation within the one-week window

Outcome of ISIL conducts a radiological and chemical terrorist attack conditional on outcome of option chosen
0.8 Probability that airstrike seals bunkers | Successful airstrike
0.2 Probability that airstrike leaks chemical and radiological agents into nearby areas | Successful airstrike
0.8 Probability that ISIL conducts chemical weapons attack on Turkish refugee camp | Unsuccessful airstrike
0.2 Probability that ISIL does not conduct chemical weapons attack on Turkish refugee camp | Unsuccessful airstrike
0.9 Probability that the joint special operations forces team locates and seals bunker | Successful diplomacy
0.1 Probability that the joint special operations forces team fails to successfully locate and seal the bunker | Successful diplomacy
0.8 Probability ISIL conducts attack on refugee camps in Iraq and Turkey | Unsuccessful special operations mission, Successful diplomacy
0.2 Probability that ISIL does not attack refugee camps in Iraq and Turkey | Unsuccessful special operations mission, Successful diplomacy
0.6 ISIL conducts a combined radiological and chemical weapons attack on a European capital | Unsuccessful diplomacy
0.4 ISIL does not conduct a combined radiological and chemical weapons attack on a European capital | Unsuccessful diplomacy

Value of Outcome (lives lost)
5000
10000
15000
8000
Appendix B

Sensitivity of decision on probability Moscow agrees to joint operation. Initial estimate of Russia’s cooperation: 0.4. Expected value of outcomes is equal at intersection of the two lines (p = 0.47).
Appendix C

Sensitivity of decision on probability that US aircraft successfully penetrate air defenses and locate bunker. Initial estimate of probability: 0.7. Expected value of outcomes is equal at intersection of the two lines (p = 0.66).
Appendix D:

Sensitivity of decision on probability ISIL chooses to attack Europe. Initial estimate of probability: 0.6. Expected value of outcomes is equal at intersection of the two lines (p = 0.55).
Works Cited


