

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.
PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE (DD-MM-YYYY) 05/09/2017		2. REPORT TYPE Master's Thesis		3. DATES COVERED (From - To) SEP 2016 - MAY 2017	
4. TITLE AND SUBTITLE The Third Off-Set Strategy; Cumulative Review of Victory				5a. CONTRACT NUMBER N/A	
				5b. GRANT NUMBER N/A	
				5c. PROGRAM ELEMENT NUMBER N/A	
6. AUTHOR(S) Major Mikita R. Brown, USAF				5d. PROJECT NUMBER N/A	
				5e. TASK NUMBER N/A	
				5f. WORK UNIT NUMBER N/A	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) USMC Command and Staff College Marine Corps University 2076 South Street Quantico, VA 22134-5068				8. PERFORMING ORGANIZATION REPORT NUMBER N/A	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) N/A	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT US strategists, joint planners, and industrial developers are looking to integrate Manned and Unmanned Teams (MUM-T) across multiple domains in future battles to create the much needed Third Off-Set of US Strategic Superiority. Fueled by MUMT, the Third Off-Set's indicators of success would be to ensure US led forces overwhelm numerically superior adversaries, penetrate Anti-Access Area Denial (A2AD) defensive layers, and engage targets from an advantageous range with speed, precision, and destruction. Synchronized MUM-T with current Second Off-Set architecture will accelerate the loop of decisive actions and deliver US led forces the grand victory of "Decision Superiority."					
15. SUBJECT TERMS Desert Storm; Scud Hunt; TBM; Ballistic Missile; Nuclear; A2AD; C2; ISR; Fires; Family of Systems; FoS; Third Off Set; MUMT					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (Include area code)
Unclass	Unclass	Unclass	UU	59	USMC Command and Staff College (703) 784-3330 (Admin Office)

United States Marine Corps
Command and Staff College
Marine Corps University
2076 South Street
Marine Corps Combat Development Command
Quantico, Virginia 22134-5068

MASTER OF MILITARY STUDIES, ADVANCED STUDY PROGRAM

TITLE:

The Third Off-Set Strategy; Cumulative Review of Victory

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

AUTHOR:

Major Mikita R. Brown, USAF

AY-17

Mentor and Oral Defense Committee Member: Paul Golpe PhD
Approved: [Signature]
Date: 8 MAY 2017

Oral Defense Committee Member: Benjamin Jensen PhD
Approved: [Signature]
Date: 8 MAY 17

Executive Summary

Title: The Third Off-Set Strategy; Cumulative Review of Decisive Victory

Author: Major Mikita R. Brown, United States Air Force

Thesis: US strategists, joint planners, and industrial developers are looking to integrate Manned and Unmanned Teams (MUM-T) across multiple domains in future battles to create the much needed Third Off-Set of US Strategic Superiority. Fueled by MUM-T, the Third Off-Set's indicators of success would be to ensure US led forces overwhelm numerically superior adversaries, penetrate Anti-Access Area Denial (A2AD) defensive layers, and engage targets from an advantageous range with speed, precision, and destruction. Synchronized MUM-T with current Second Off-Set architecture will accelerate the loop of decisive actions and deliver US led forces the grand victory of "Decision Superiority."

Discussion: Decision Superiority was the patented product of John Boyd's Grand Strategy, which greatly influenced the Gulf War strategy, allowing the United States to outpace and out maneuver the adversary mentally, physically, and morally. Decisive victory in North Korea, as in the Gulf War Campaign, will require a phased approach that incorporates a strong shield for rapid storm strategy. In March 2017, Secretary of State Rex Tillerson declared the end of the "Strategic Patience" era, putting "all options on the table." The United States must determine a new course and new policy that will create or expand power before utilizing all options on the table. The challenge to military planners requires new *ways* to employ MUM-T systematically and create a Third Off-Set "shield" that will expand a coalition's maneuver space and allow Phase II, Seize the Intuitive, for a "storm-like" offensive.

The glaring defeat of the Gulf War Campaign was the SCUD Hunt for Iraqi theater ballistic missiles (TBMs). Historic case analysis attributes this failure to an inaccurate and incomplete intelligence estimate, poor prioritization of collection and assessment data, an ineffective aerial campaign, and SOF infiltration without supporting architecture to render target solutions or destruction. This identified weakness of the Second Off-Set technology weighed heavily on Secretary Collin Powell and Vice President Dick Cheney's decision to commit forces for a pre-emptive strike before Iraq was able to advance their missile force with weapons of mass destruction. However, the era of Strategic Patience has allowed North Korea to test and accumulate a nuclear arsenal of over 30 warheads, leaving no option of pre-emptive strikes without massive retaliation.

Conclusion: The United States consideration of the Third-Offset Strategy has become misaligned, congested with competitive ideas driven by inter-service rivalry and fueled by joint service relevance. In order to make on-time progress for on-target capabilities we must rethink MUM-T requirements and ensure geospatial design authority is delegated to Geographical Combatant Commanders (GCC) to authorize a "team of teams" approach towards the synchronization of global reach across multiple domains to project precision power and gain desired effects; the Third-Offset which requires superior *ways* of employing integrated *means* that deliver decisive *ends*. In the words of John Boyd, "victory is not a product of technical solutions but the mastery of strategy." The product of the Third Off-Set will be a rapid synchronized Family of Systems (FoS) that employs MUM-T and Artificial Intelligence (AI) aided capabilities to produce rapid paralysis upon the enemy and maintain "Decision Superiority."

TABLE OF CONTENTS

Executive Summary	i
DISCLAIMER	iv
Acknowledgments.....	v
INTRODUCTION	1
HISTORIC ANALYSIS OF DESERT STORM’S SCUD HUNT, 1991	2
THE STRATEGIC ASSESSMENT:.....	3
Iraqi Scud enhancements were a necessity, but failed to be identified as an US collection priority.....	3
ROCKET SCIENCE, THE TECHNICAL ASSESSMENT:	6
The Scud Force Enhancements	6
THE EVOLUTION AND ENHANCEMENT OF IRAQ’S INDIGENOUS MISSILE INVENTORY	7
CONTRIBUTIONS OF A FLAWED INTELLIGENCE PREPARATION OF THE BATTLESPACE:	10
Espionage by German Sympathizer	10
Iraq’s Pivot Toward Mobility - the Outcome of Espionage Spill	10
Strategic Battle to Counter the Iraqi Scuds - World War II to Desert Strom, Battle in Strategy	12
THE SCUD HUNT: (Phase-I: Air Campaign)	16
Information Superiority-to-Fire Superiority	16
Phase I: When “ <i>Intelligence</i> ” is flawed = “ <i>Fires</i> ” Fail	19
THE SCUD HUNT: (Phase-II: SOF INFIL)	19
Human in the Loop for Positive ID-for-Positive Kills.....	19
Command, Control and Communications (C3) Architecture;.....	21
Phase II: When “ <i>Architecture</i> ” fails to link [Sensor+ Shooter+ Authorization ≠ DT], “ <i>Fires</i> ” fails	21
Post War Analysis -Phase I + Phase II (BDA) vs UN Assessment:	22
Data reported by UN Inspections of SCUD Force	22
Gain & Maintain [Information+ Air+ Fire Superiority] = “ <i>Decision Superiority</i> ”	23
Post War Lessons Learned - John Boyd’s (OODA Loop) Strategy:	25
To the Swift Goes the Race	25
Renewing the US Concept of Strategy:.....	26
(Means-Based =Sum) vs (Ways-Based = Product)	26
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA (DPRK) WAY FORWARD	30
(Rethinking the US- DPRK Strategy).....	30

Current Situation of US-DPRK Tensions 2017: <i>“The End of Strategic Patience”</i>	32
Rethinking the North Korea Plan: Synchronizing the Third Off-Set Strategy	33
SME SELECTION AND ODG PARTICIPANTS:	34
The Operational Decision Game – N. Korea 2020	35
(SME MUM-T Gap Analysis)	35
<i>Selection of heavy</i> [Missiles (RV)/ Rockets (Hi & Low) /Bombs (Dumb, GBU/MOA)]	42
RECOMMENDED SOLUTIONS	44
Select Acquisition Model for Korea’s FoS Solutions with a “Fight Tonight” Urgency	45
Adjust Plans That Acknowledge Threat; Dispose Disproven Assumptions.	46
MULTI-DOMAIN COMMAND & CONTROL(MDC2) ENHANCED BY MUM-T.....	48
“Sustains Technical Superiority for Decision Superiority” = A Dominate US Strategy	48

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

QUOTATION FROM, ABSTRACTION FROM, OR REPRODUCTION OF ALL OR ANY PART OF THIS DOCUMENT IS PERMITTED PROVIDED PROPER ACKNOWLEDGEMENT IS MADE.

Acknowledgments

I would like to extend my appreciation to Dr. Paul Gelpi and Dr. Benjamin Jensen for their assistance, guidance, and mentorship throughout the Master's of Military Studies, Advanced Study process. Additionally, I would like to acknowledge the Command and Staff College military and civilian faculty advisors who have educated and challenged me throughout the academic year.

INTRODUCTION

The United States remains unmatched in its ability to extend a global reach across multiple domains under the guidance of decisive intelligence collected and disseminated across the largest enterprise of intelligence based data in the world. Collectively these capabilities give the United States a technology and information superiority that allows its military to function with few compatible competitors. No country can challenge the United States with military means on a global scale and win. However, global strength gain and maintain air and maritime superiority remains challenged by Anti-Access Areal Denial Strategies. The US military weakness vulnerabilities target and destroy theater ballistic missile and the political hesitation to approach costal cruise missile defense systems was initially exploited during the 1991 Gulf War campaign.

The Gulf War Scud Hunt was a defeat of the US most modern and technologically superior systems by primitive World War II enhanced rockets. The inability to maintain a defensive shield overtime caused leaders to rapidly prioritize the hunt for these large Transport Vehicles firing large Scud Bodies from the flat desert terrain in the dark rural areas of Iraq. However, Saddam managed to employ these Scuds throughout the campaign with little degradation to the missile force.

This paper examines the lessons learned from the Gulf War Scud Hunt and applies the compounded challenge of the Korean Peninsula under the threat of a nuclear armed North Korea. The challenges of penetrating the Anti-Access Area Denied layers of defense will require a smart power application to acquiring MUM-T systems capable of enhancing the combined force ability to defend the Peninsula

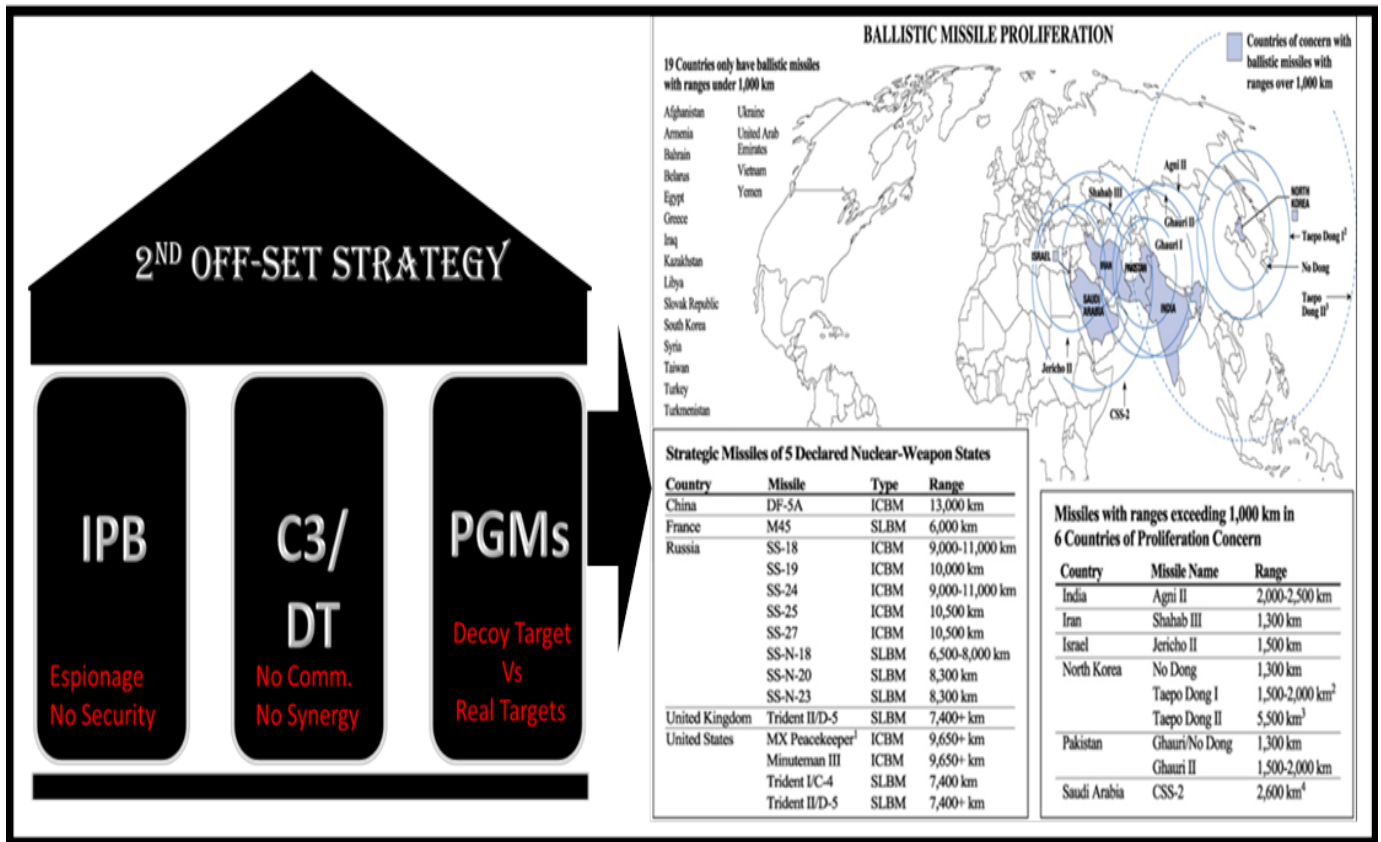
against North Korea's aggression and launch a decisive offensive if deter and de-escalation fails.

HISTORIC ANALYSIS OF DESERT STORM'S SCUD HUNT, 1991

The U.S.-led Coalition stormed the deserts of the Gulf in 1991. It was the unveiling of Western modernization and capability of waging effects across all domains, synchronizing all branches, unifying multiple partners under a single state of the art network, utilizing precision guided weapons, stealth technology and space-based military communication and navigation. The Gulf War campaign remains the US exhibition of modern deterrence, assurance, and rapid power projection. The Gulf War provided the United States with a wide spread victory, shadowed only by a single-operational defeat which failed to destroy the Iraqi Scud capability. A combination of precise pre-planned strikes would be needed to disrupt and neutralize the Scud opposition, while rapid Intelligence, Surveillance, and Reconnaissance's systems fed a Command, Control and Communication architecture (C3ISR) that would allow the Coalition forces to attrite and destroy the Iraqi Scuds. The US Second Off-Set strategy was heavily dependent depended on intelligence system gathering information in preparation of the battlefield (*IPB*), delivering decisive waves of precision guided munition (*PGMs*) from a variety of delivery systems across all domains, enhanced by C3 architecture that could detect, target, engage and access any dynamic target (*DT*). The combined concept of secure IPB, effective PGMs and rapid C3 for DT creates the foundational pillars of tactical success of the second off-set strategy. If either of these pillars falls, it creates a domino effect for the tactical operation. Superior fire power required superior flow

of information across a saturated electromagnetic spectrum. Many studies of the 1991 Iraqi Scud Hunt show the infractions within of all three pillars led to the overall failure of the “Scud Hunt” Operations. Additionally, the use of Scuds displayed the ability of a cheap, 50-year-old technology to cause strategic unbalance, air effects, and regional deterrence-- giving new value to a foundational deterrence strategy, Anti-Access Areal Denial (A2AD).

Figure 1: The 3-Pillars of the 2nd Off-Set with “Scud Hunt” Infraction highlighted in red and the right is mass proliferation of ballistic missiles around the world.



THE STRATEGIC ASSESSMENT:

Iraqi Scud enhancements were a necessity, but failed to be identified as an US collection priority

Desert Storm displayed a spectrum of victories across multiple domains using a modern display of war fighting technology and tactics. But with the overwhelming

success experienced during the desert campaign many wonder why the United States failed at the fundamental task of destroying the Iraqi Scuds? Saddam Hussein's strategy aimed to disrupt or disassemble the mass participation of multiple Arabic and Islamic nations. The common enemy of the region was Israel. If he could bring Israel into the war Iraq would stand a chance of uniting the Islamic states against Israel and the western invasion. However, the advancement of the Israeli Air Defense systems would require heavy formations to penetrate the contested zone of overlapping systems, ultimately resulting in heavy losses. Additionally, Saddam's Air Force was denied forward basing and over-flight permissions by Syria (member of U.S.-led coalition) and Jordan (neutral state); creating an anti-access areal denial (A2AD) problem for the legacy Iraqi fleet. Saddam's strategy for the A2AD challenge was the advance tactics of the Scud Missile Force. Ballistic missiles and rockets were able to fire conventional payloads into the heart of Israel striking its heavy populated communities. A traditional aerial attack would have required intense planning, heavy formations, and layered attacks, and it would have resulted in multiple losses to aircraft and personnel. However, multiple Scud launches with heavy salvo proved to deliver the desired effect of an aerial bomber without losses.

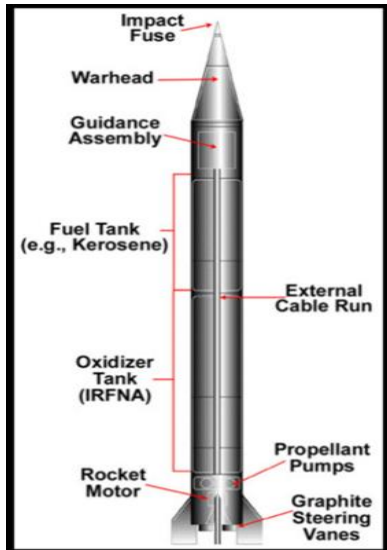
The United States had the advantage of observing the Iraqi military's capability for over an eight year period of continuous fighting, 1981-1988, during the Iran-Iraq War.¹ The actual success versus failure metric begins with the mastery of information gathering or IPB, the first pillar of success for the 2nd Off-Set Strategy. The Coalition capability and readiness was a product of detailed plans, intelligence estimates, and interagency support. Iraq's missile force employed the Soviet Scud-B

missile, originally designed and deployed in 1960.ⁱⁱ This Scud-B variant was a modification of the German V-2 employed during World War II, September 1944 to March 1945.ⁱⁱⁱ The Scud-B had proven to be a reliable weapon for the Baghdad based team throughout the Iran-Iraqi War.^{iv} The Scud-B was first used in 1982. Iraq retaliated after absorbing the first-strike and launched Scud-Bs against Iranian civilian population centers.^v The Scud missiles were largely limited in their ability to produce anything more than a terror effect. The Scud-B lacked the accuracy required for battlefield employment with a mixture of friendly and adversary forces, as well as, low to no calculation ability against mobile units. In spite of these challenges, there were 203 Scud-Bs launched against various targets in Iran, but they caused relatively little destruction.^{vi} Key targets like the Iranian capital of Tehran were beyond the range of the Scud-B missile. Tehran is 510 kilometers from the Iraqi border, which is over 220 kilometers beyond the range of the Scud-B.^{vii} Iraqi Scuds were left with a legacy of low to no battlefield effectiveness, but persistent launches could prove useful against civilian targets. This legacy drove the IPB and targeting scheme for Iraq's Scud capability. The Scuds were categorized to be nothing more than terror weapons whose most likely course of action equaled its most dangerous, attacks against civilians. The Gulf War intelligence team predicted that Iraq would launch Scuds against city centers but failed to consider the advancement of an experienced missile cadre and the investment returns gained from a persistent interwar period.

ROCKET SCIENCE, THE TECHNICAL ASSESSMENT:

The Scud Force Enhancements

Figure 2: Enhanced Scud-B



Iraqis made several modifications to the Scud-B during 1988 to 1990, the end-of-war and inter-war period. In total, Iraq invested billions of dollars to advance its missile systems.^{viii} There were over 17 facilities constructed for research, production, testing, and repair of ballistic missiles, launchers, and rocket fuel.^{ix} Modifications were required for body, booster, and warhead. Iraq's initial modification weighted focus and resources on the advancement of missile bodies and boosters to improve range. Iraqi engineers reduced the payload weight and created faster burn-rate for the missile fuel, which increased the Scud's range.^x Multiple modifications were made from the bottom-up, rocket motor, oxidizer and fuel tank which added range (*Figure 2*). Next modifications examined ways to improve accuracy and effectiveness of the Scud against militarized targets. In order to improve accuracy, Iraqis fired from pre-surveyed sites, which allowed reductions in error by several hundred meters. Pre-surveyed sites supported conventional warheads aimed at small-area targets whose coordinates are exactly known.^{xi}

Targeting problems proved to be more challenging to resolve and required accurate calculations and advantageous atmosphere conditions. Suitable wind conditions were difficult to achieve and could greatly impede the missile launch.^{xii} However, extreme winds were a lesser concern for the reentry or target site.

Additional problems challenged accuracy during reentry. The value and technical advancements required to improve reentry of the warhead were largely ignored. Most significant advancements were made to the body and booster to enhance range and fire capability. However, scientific improvements to the warhead were lacking, advancements were needed to aid the accuracy and effectiveness of the reentry vehicle (Figure 2 illustrates the major components of the missile body, bottom-up refinements extended range, but without warhead and fuse improvements the Scud-C remained missile with limited destruction capability). This component remained fragile: any problem with the shape, weight, or balance in the warhead or missile body caused tumbling and break-up.^{xiii} The necessity for Saddam Hussein to overcome the potential A2AD environment required range to be the top priority for advancement efforts.

THE EVOLUTION AND ENHANCEMENT OF IRAQ'S INDIGENOUS MISSILE INVENTORY

In spite of the challenges with the missile body and warhead, Iraq achieved its first improved Scud variant and was able to deploy it on 29 February 1988 against Iran.^{xiv} This new variant was named *Al Hussein*. This new missile gave Iraq the necessary range to reach Tehran with a reduced payload package, shrinking from 985kg (2,170 lbs.) to 190 kg (420 lbs.) to ensure the top priority, range, was enhanced by 100% growth.^{xv} Additionally, the new variant carried 25% more fuel than the regular "Scud-B."^{xvi} US data indicated missile modifications facilitated achievement of 650 kilometers (375-400 miles), with a warhead of 300 kilograms (660 pounds), with a flight time of 420 seconds within a circular error of probability (CEP) of 1,700-2,300 meters and a 160 minute re-fire rate that allowed

Iraq to fire an average of three *Al Husseins* per day, reaching 135-160 missiles against Tehran from February 29 to April 18 1988.^{xvii}

The second modification was named *Al-Hijarah* or “stones” after the stones used by Palestine children and teenagers in the Intifada.^{xviii} The *Al-Hijarah* made further modifications to the fuel tanks that were relatively crudely welded into the main body. This created more instability during re-entry, which was a great advantage during the Gulf War. The early break-up of the re-entry vehicle created a decoy effect for the Patriot system, the radar was not able to separate or delineate the actual re-entry vehicle from debris¹ fragments.^{xix} By 1990 the *Al-Hijarah* maximum range was 700-900 kilometers (435-560 miles) carrying a payload of 100 to 300 kilograms (660 pounds), for a flight time of 540 seconds, impacting with a CEP of 2,500 to 3,000 meters.^{xx}

Subsequent variants and improvements did not become operational prior to the invasion of Kuwait, and many experts assess that if these systems would have been employed by Iraq during the Gulf War the outcome would have been very different. These advancements were attributed to the productiveness of the 23-man missile technology development team from Brazil, under the leadership of retired Major General Hugo de Olivera Piva.^{xxi} The General had previously served as the director of Brazil’s Aerospace Technology Center. His team helped Iraq develop two related systems: the *Al Abid* and the *Tamuz*.^{xxii} The Brazilian team partnered with Canadian designer of the Super Gun, Dr. Gerald Bull, to create the 48-ton, three-stage missile

¹ The unintended design flaw of the Iraqi Scud that cause unstable break-up became a design attribute for modern TBMs. To defeat acquisition upon re-entry warheads are designed with the Early Release of Sub-munition (ERS) feature. Re-entry vehicles with ERS capability continues to challenge to the U.S. Patriot Defense Design.

system with an estimated range of 1,200 kilometers (746 miles).^{xxiii} The design was in test phase at the start of the Gulf War. The *Tamuz* had only made it through the design phase. It was similar to the *Al Abid* but modifications allowed it to reach ranges of 1,500 kilometers (932 miles).^{xxiv} Iraq also sought titanium furnaces from the US to improve the accuracy of the warhead nose cone design. These modifications would have given Iraq the capability launch missiles capable of achieving sufficient range and payload to deliver a large nuclear weapon or a large chemical or biological payload against any target in Israel and Iran from launch sites deep in Iraq.^{xxv} As stated by Secretary Rumsfeld during Operation Iraqi Freedom, “You go to war with the army you have, not the army you might want or wish to have at a later time.”^{xxvi} Saddam Hussein was forced to move ahead with his plans to invade Kuwait, although his missile force was still testing the *Al Abid* and developing the *Tamuz*.

Figure 3: Summary of Scud Evolution from the Germany’s V-2 to Iraq’s Tamuz.

	German V-2	Scud B	Al-Hussein	Al-Hijarah	Al Abid/Tamuz
Date Appeared	3-Oct-42	3-Aug-87	18-Mar-88	7-Dec-89	-
Number of Stages	1	1	1	2	3
Diameter (meters)	1.651	0.884	0.884	0.884	-
Length (meters)	14	11.7	12.55	13	-
Weight (Kg)	13,000	6,300	7,340	34,500	-
Range (km)	320	280	600	750	1,200-1,500
Payload (kg)	738 kg	985 kg	Reduced 190 kg		Increased 750 kg
CEP (meters)	UNK	900	3,000	3,000-5,000	5,000+
Fuse	Variable Proximity	Variable Proximity	Variable Proximity	Variable Proximity	-
Flight Mach	4.3	4	4	4	-
Flight Time (minutes)	6.5	6.0-6.5	8.0-9.0	12-Oct	-

Salvo Cape	100 per day
Sustain Rate	350 per week

CONTRIBUTIONS OF A FLAWED INTELLIGENCE PREPARATION OF THE BATTLESPACE:

Espionage by German Sympathizer²

Jurgen Gietler, an archivist for the German Foreign Ministry, was a recently converted member of Islam. He found himself in a unique position to demonstrate his commitment to the Arabic nations by sharing information with Iraqi President, Saddam Hussein. The German Foreign Ministry was not a heavily guarded or protective of the sensitive classified information it held. Gietler described it as “a complete lack of security.” After six months of sharing classified information, to include sensitive satellite imagery, Jurgen Gietler was secretly arrested in May 1991. Included in Gietler’s documents were the Western targeting scheme and surveillance collection of Iraq’s missile site. By Gietler’s sharing this plan, Iraq gained a clear advantage to launch a deception strategy and fill the known sites with realistic decoys while the true tactics pivoted to a mobile capability without the knowledge of the US intelligence community, fracturing the first pillar of IPB and crippling the effectiveness of the US air campaign.

Iraq’s Pivot Toward Mobility - the Outcome of Espionage Spill

Iraq had two means of launching the Scuds: fixed launchers and mobile transporter-erector-launchers (TELs).^{xxvii} Although the fixed sights provided more accuracy and effectiveness, Saddam’s top priority required an increase in range. The additional leverage gained by the classified documents shared by Jurgen Gietler made mobility, cover, and speed subsequent priorities. The Scud Hunt for mobile

² Espionage remains a continued concern on the Korean Peninsula. Current on-the-shelf plans have been compromised by ROK military officers who remain sympathetic to the vision of unification. Additionally, mishandling of classified material remain a concern amid the cyber capability of DPRK.

TELs searched for two vehicles: the Soviet-made, eight-wheeled *MAZ-543* and the newest TEL variant, the *Al Waleed*, a modified civilian Saab-Scania tractor-trailer.^{xxviii} The missiles were deployed in brigade-sized formation of three to four regiments based on a Soviet model.

The missile force appeared to be headquartered near Taji, north of Baghdad, which became the center of Iraqi Scud missile operations during the Iran-Iraq War.^{xxix} US experts initially assessed that the missile force would be easy to target. Planners estimated 24-36 Soviet-supplied mobile missile launchers supported by three to four regiments.^{xxx} The newly operational *Al-Walid* supplemented Iraq's standard Soviet-designed *MAZ-543* launchers. Introduction of this new system is one element that caused the Iraqi missile force to be less predictable than intelligence experts estimated. Iraq also constructed new fixed missile complexes in western Iraq.^{xxxi} The construction of these fixed sites led US intelligence and Coalition air planners to focus on them as major targets. This proved to be a mistake.^{xxxii} While Iraq knew fixed sites could be used to launch several volleys with expedited re-fire capability, Iraq also learned that the United States could detect these sites via satellites and destroy their capability in the event of war.^{xxxiii} Iraq continued construction on these sites to expand its decoy and deception strength of the newly developed missile tactics. Additionally, the dispersal of Iraq's mobile missile units near a wide range of potential launch sites made it difficult to target. The use of pre-surveyed sites had expanded across vast areas of Iraq.³

³ This targeting challenge and site validation remains a compounded challenge for the DPRK targeting plan. With the nation's closed existence and underground facilities, determining which sites are real versus decoys remains a prediction of probability.

Iraq's mobile teams minimized aerial detection by improved camouflage, extensive use of gullies, wadis, civil buildings, and highway underpasses.^{xxxiv} This allowed the force to achieve surprise and operate from positions that coalition military leaders had not expected, such as hardened shelters at air bases and built-up areas, and protective well-hidden holding pens for TELs along highways in western Iraq. Next, the missile force was able to achieve speed in its firing doctrine's modification. Iraqis shortened the Scud launch process in an effort to prevent post-launch detection.^{xxxv} During the Iran-Iraq War, the missile crews used a launch sequence that required 90 minutes from set up to launch.^{xxxvi} Western ability to detect telltale telemetry could cause the Coalition to target the missile force at any point during the launch sequence before the Scud Force had an opportunity to launch. However, the Iraqis made modifications to reduce the telemetry emission and achieve speed of launch by reducing the preparation sequence from 90 minutes to less than 30.^{xxxvii} The deception and disguise made it difficult for the United States and its coalition partners to gain a complete picture of the missile and TEL inventory or its locations.⁴

Strategic Battle to Counter the Iraqi Scuds - World War II to Desert Storm, Battle in Strategy

Saddam exploited the overt strategy of ballistic missiles, create fear among the civilian populace and destroy objects at range. Theater Ballistic Missiles (TBMs) are merely a subset of the greater ballistic missile threat. This battlefield threat was introduced during World War II's V-weapons. The Iraqi Scud-Bs and

⁴ TEL inventory, launch tactics and employed locations remain unknown. China's commitment of military force and possible military equipment make an accurate intelligence estimate for DPRK Scud Force fleeting.

subsequent models are derived from German technology. During World War II, the V-weapons earned centers stage, causing Winston Churchill to increase pressure on General Dwight Eisenhower warning that these weapons would produce a political defeat. The European Allies had to adjust their strategy, means winning wars. Clausewitz explains “war as politics by other means.”^{xxxviii} Post-war Implementation Agreement of 15 September 1947, assigned the US Air Force responsibility for certain intelligence functions, strategic missiles, guided missiles and air defense. However, the Army retained control of tactical missile systems and the Patriot Defense System. All these lessons would unfold in the 1991 Desert war, where competing strategies were won by the policy makers in Washington, rather than the Generals on the frontline.

Figure 4: *The Competing Struggle and Missile Strategy*



On the afternoon of 17 January, Iraq’s missile force went into action, launching Scuds towards the Israel suburbs of Tel Aviv.^{xxxix} On 18 January, the missile force displayed its multi-axis, salvo capability, by launching near simultaneous strikes

against Saudi Arabia and Israel. Iraq launched seven Scuds against the heart of Israel cities, Haifa and Tel Aviv.^{xi} While the blast did not produce any direct deaths, several Israelis died of shock-induced heart failure, 96 people were wounded, and 1,700 apartments were damaged.^{xli} Saddam Hussain's investment in his missile force yielded great returns. The performance measured in the first two days presented greater accuracy, speed, mobility, and range than the US Coalition had anticipated. The Iraqi Scud strikes caused large-scale panic in Israel and a desire to enter the war and retaliate. However, Secretary Cheney understood that retaliation by Israel would destroy the Coalition and threaten the success of the campaign. Cheney's political efforts aimed to keep Israel out of the war, which meant diverting resources and altering the campaign.^{xlii} General Schwarzkopf reportedly regarded the Scuds as a "nuisance" with "little military significance"^{xliii} and did not see the need to pivot or alter the campaign plan as he said, "where you stand on the issue depends on where you sit."^{xliv} Intelligence sources had led General Schwarzkopf to believe the Scuds of the 1991 Gulf War were the same weapon observed during the Iran-Iraq War, which had ended only three years prior. Schwarzkopf stated that the Scuds only held the potential of a single airplane flying 300 miles to haphazardly drop one small bomb, with a 160 pound warhead that would land miles away from its intended target. Schwarzkopf stated "in the grand scheme of warfare, Scuds are a mosquito."^{xlv}

But by 18 January Iraq Scuds proved to be much more than mosquitos. The new variants and combined tactics allowed the force to perform as long range strategic bombers no longer limited to 300 miles, but extended to 560 miles, and to replicate

a tight bomber formation with near-simultaneous salvos and rapid re-fire capability, delivering warheads with 660 lbs. of ordinance against a multi-axis offensive.^{xlvi} Secretary Cheney viewed the effectiveness of the Scuds as failure in ISR coverage and campaign planning. General Schwarzkopf saw little need to dedicate a ground force to search, locate, and identify nine to ten trucks dispersed over an area of 29,000 square miles, which would be comparable to searching all of the state of South Carolina (31,000 square miles).^{xlvii} During the first week of the air campaign Iraq launched 26 missiles against Israel,^{xlviii} panic and fear caused Israel to threaten US strategy and take matters into their own hands with an Israeli air and ground offensive against western Iraq.

Israel wanted to strike back, an action that would destroy the US Coalition's legitimacy and efforts to liberate Kuwait.^{xliv} Cheney refused to debate Schwarzkopf on this issue stating, "Goddamn it, I want some coverage out there...I am the Secretary of Defense, the Defense Department will do as I tell them."¹ Highly televised coverage of the Patriot's protection of Dhahran gave the world a false impression that the United States had an effective missile defense capability and gave Israel motive to request the immediate support of the Army's Patriot systems. Secretary Cheney and his team ordered the move of two Army Battalions and 32 missiles for coverage of protection of Israel.^{li} This gap in defense coverage contributed to penetration of Dhahran on 25 February, a single conventionally armed Scud produced the greatest number of US fatalities during Desert Storm when a barrack was struck, killing 29 and wounding 98.^{liiii} When comparing the

losses of US troops to the casualties in Israel, General Schwarzkopf's prediction were spot on, the Iraqi Scuds were mere "mosquitos."

THE SCUD HUNT: (Phase-I: Air Campaign)

Information Superiority-to-Fire Superiority

The coalition planning team was "well aware of the potential threat posed by Iraq's ballistic missiles."^{liv} During the opening days of the Gulf War a large number of sorties were directed at the fixed Scud launch sites and at the manufacturing facilities for the missiles. This was a false sense of information superiority, a flawed IPB and a failed targeting scheme. By the evening of 17 January, it was obvious that bombardment against Iraq's Scud capability had failed. The coalition learned that these pre-surveyed fixed sites were decoys, intended to draw the attention of the coalition while the mobile Scud TELs dispersed to hidden locations. This created what General Schwarzkopf later referred to as hunting a needle in a haystack. The coalition need to execute a dedicated "Scud Hunt" campaign, this improvised mission set led to several coalition losses in sorties and combat aircraft, including decreased strikes against Iraqi ground forces.^{lv} The "Scud Hunt" diverted a total of 2,500 sorties to chasing Scuds, with 1,000 sorties dedicated to "Scud Patrol".^{lvi} This diversion gave Scud Hunting a greater weight of effort than the Integrated Air Defense System, "IAD Take-Down," and lines-of-communication targeting combined.^{lvii} At one point, planners proposed a full three day campaign, utilizing over 2,000 aircraft to search and destroy Scuds in and around Al Qaim, Rutba, and Iraqi City.^{lviii}

With the tremendous targeting effort dedicated to these targets many experts remained unable to provide an answer to why the Scuds survived. Post war analysts show that Iraq fired 40 missiles towards Israel, 34 were intercepted by Patriot, and direct Scud damage only resulted in two deaths whose causal factor was heart attack inflicted by fear.^{lix} Another 232 people suffered superficial injuries, and one person suffered severe injuries, which indicates that the main damage was done by fear, shock, and misuse of civil defense equipment.^{lx} While Israeli newspapers reported the damage to almost 12,000 apartments, only 74 suffered significant damage, and the majority of reported damage consisted of broken windows.^{lxi} As a result, many are left to wonder if the Iraq missile force success was short lived, with low damage inflicted, the weapons have lost much of the terror effects produced during the war.^{lxii} Instead, air planners worked with the intelligence to define two target locations where launch activity was likely to occur. These areas were commonly referred to as “Scud Boxes” or “Kill Boxes.”^{lxiii}

The primary Scud Hunt aircraft was anticipated to be the F-15E due to its LANTIRN (Low-Altitude Navigation and Targeting Infrared System for Night). However, a combined approach was needed, two-Defense Support Program (DSP) satellites were used in effort to create a three-dimensional model that could estimate the trajectory and probable impact of each launch.^{lxiv} Probable impact point was calculated within two minutes of the launch, communicated to the Gulf and Israel network within five minutes of the launch, which allowed only 90 seconds of early warning.^{lxv} The DSP satellite system was not precise enough to allow aircraft to find the target. However, with night launches being the primary method of

employment, DSP satellites combined with the LANTIRN to target and kill missiles. During the day, F-16C/D and A-10s were used to cover the roads and key launch areas during the day along with B-52s and F-117As which were used to strike storage and production facilities. Intelligence analysis improved over the course of the operation, allowing targeteers to locate Scud production and support facilities, as well as, possible hide sights within each “Scud Box.”

Unfortunately, the overall hunt system proved to be nothing more than a sophisticated system of guesswork, which resulted in wasted munition striking Scud-like or Scud possible targets.^{lxvi} Approximately 50% of the strike sorties hit “possible hiding” places, fixed structures along roads, culverts, and underpasses.^{lxvii} Another 30% struck production facilities and infrastructure while only 15% were flown against targets believed to be actual mobile launchers, hitting an undetermined number of decoys.^{lxviii} A false sense of success was declared after the Scud weekly launch rate decreased by 50% and remained low throughout the rest of the conflict.^{lxix} Other champions of success compare the significantly lower Gulf War launch rates to those launches used during the Iran-Iraq War. However, when the ballistic missile’s strategic relevance is analyzed, the political and strategic differences between of the 1988 War of Cities and the 1991 invasion of Kuwait lack variable similarities. Some experts attribute the decrease in launches to the overall Iraq strategy, which sought to conserve missiles for a war of unknown length and failed to maintain attacks against Israel due to the perceived success of the Patriot system and Israel’s willingness to avoid retaliation.^{lxx} Iraq launched as many missiles in the last eight days of the war as it did during the first seven,

demonstrating that coalition efforts had not degraded its capacity or capability to launch.^{lxxi}

Phase I: When “Intelligence” is flawed = “Fires” Fail

Intelligence first failed to detect Iraq’s mobile capability, leaving mobile launch or intermediate assembly or preparation sites unallocated. Intelligence estimates used by US military planners at the beginning of the air war counted 28 fixed launchers at five missile complexes in western Iraq, as well as a number of training launchers in other parts of the country.^{lxxii} Air campaign planners had a list of fixed launch sites to target and destroy within the first 48 hours, but these were all decoys and distractors. Tactical intelligence assets as struggled to aid in target location and identification. The advanced Iraq tactics practiced extreme radio and radar emission control to avoid giving setup and launch signature away to the “Scud Patrol” aircraft.^{lxxiii} It is unclear if the US COMINT and ELINT efforts using the TLQ-17 “Sandcrabs,” TENCAP and other section systems ever detected a Scud launch. Additionally, DSP satellites could only cover a single area every 12 seconds and only detect one-third of the heat signature compared to the Soviet made ICBMs for which it was designed.^{lxxiv} Aerial sophistication proved to be no substitute for boots on the ground and physically putting eyes on the target.

THE SCUD HUNT: (Phase-II: SOF INFIL)

Human in the Loop for Positive ID-for-Positive Kills

The conventional use of ground troops to hunt for Scuds had been rejected by both Joint Chief of Staff (JCS) Chairman General Colin Powell and General Norman Schwarzkopf.^{lxxv} However, the employment of Special Operations Forces (SOF) was prompted by Secretary Cheney, after learning the British Special Forces had been

operating in western Iraq since January 20.^{lxxvi} Coalition senior military commanders, had been skeptical about using SOF for cross-border operations in Iraq, including General Schwarzkopf who stated “I just don’t know if I trust a bunch of snake eaters with this type of mission.”^{lxxvii} Nevertheless, on 7 February the first US SOF teams began searching for mobile TELs in western Iraq.^{lxxviii} American and British Forces divided the responsibility for searching the region. The US team was assigned several thousands of square miles to search in the northwest region, known as “*Scud Boulevard*,” where it was believed that Iraq was using phosphate mines as hiding places.^{lxxix} The British were assigned several thousands of square miles in the southwest area known as “*Scud Alley*” which included the H-2 airfield and the region between Highway 10 the Saudi border.^{lxxx} Teams used Air Force MH-53J Pave Low and Army MH-47E helicopters to ferry SOF ground teams and their specially equipped four-wheeled-drive vehicles from bases in Saudi Arabia to Iraq.^{lxxxi} However, navigation across the desert proved to be a major challenge.^{lxxxii} Fog, sandstorms, and cold made movement extremely difficult for even a force as well trained and experienced as the British Special Air Service (SAS) to cover. One SAS Staff Sergeant remarks, “Scuds launched at night gave a huge signature, a great fire ball of light... that could be seen 30 miles away.”^{lxxxiii} The flat, featureless terrain with no reference points created significant obstacles to the effective use of maps and because of cloud cover there was little to no ambient light in the desert at night, making night-vision devices relatively useless.^{lxxxiv} The risk of compromise by tribesmen or goat herders was another major concern.^{lxxxv} In spite of these challenges, SAS teams effectively called on air strikes,

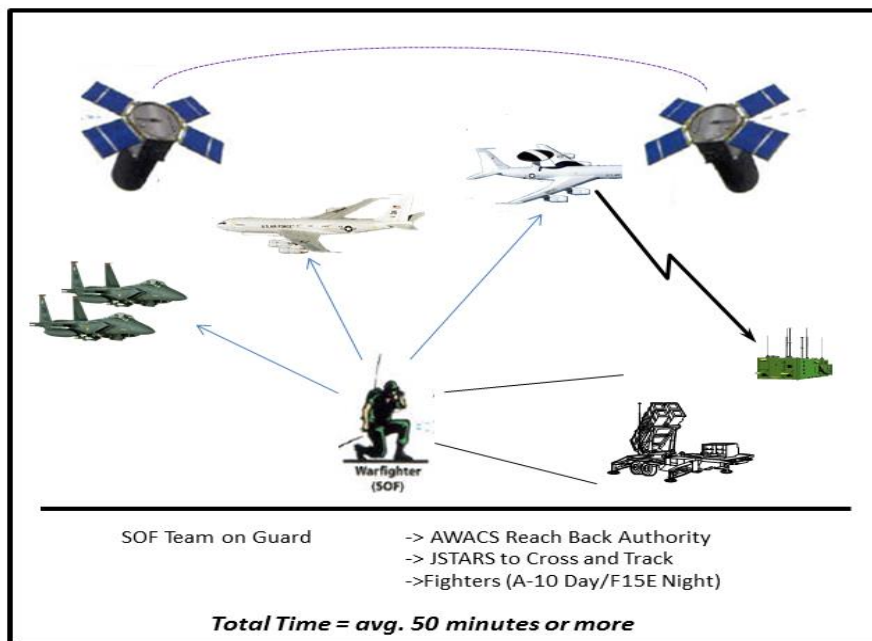
took direct action, conducted immediate Battle Damage Assessment (BDA), and captured key Iraqi prisoners.^{lxxxvi} SAS teams destroyed the fiber-optic links used to carry targeting data from Scud missile crews. Additionally, the teams were able to use plastic explosives to blow up microwave relay towers used by Iraqi missile crews for communication bunkers.^{lxxxvii}

Command, Control and Communications (C3) Architecture;

Phase II: When “Architecture” fails to link [Sensor+ Shooter+ Authorization ≠ DT], “Fires” fails

The SOF team lacked the C3 Architecture required to rapidly report, relay or draw fire on the Iraqi Scud Teams performing “shoot-and-scoot tactics.” Poor command and control procedures and architecture inhibited lethal action against the first set of air strikes. SAS teams were not given a discrete frequency to call-in or pass target information and therefore improvised by using the unsecure emergency “guard” frequency.^{lxxxviii}

Figure 5: The C2 for SOF



In an effort to improve command and control, communication procedures were established and SAS liaison officers were assigned to Tactical Aircraft Control Center (TACC) in Riyadh, the nerve center of the air campaign.^{lxxxix} However, these improvements still failed to create a time effective kill chain. SAS team would now relay targets directly to the TACC, who then relayed to the on-station AWACS, who would then pass the information to either an A-10 by day or an F-15E at night.^{xc} In total this procedure took on average 50 minutes or more,^{xcii} an unacceptable window for the quick fire “shoot-and-scoot” capabilities of Scud crews.^{xcii} Frustrated with the relatively long delays involved in calling in air strikes, SAS teams began to employ shoulder fired Milan⁵ missiles to engage Iraqi mobile TELs, support vehicles, and other associated targets directly.^{xciii}

Post War Analysis -Phase I + Phase II (BDA) vs UN Assessment:

Data reported by UN Inspections of SCUD Force

Post-war reports showed that Iraq declared only 52 ballistic missiles, 38 launchers, 30 chemical-filled warheads and 23 conventionally armed warheads at five sites.^{xciv} The UN identified and destroyed 80 missiles, 11 missile decoys, dozens of fixed and mobile launchers (38 declared), 8 missile transporters, and 146 missile storage units.^{xcv} Many experts agree that collectively the addition of the *Al Abid* and the *Tamuz* with the already operational *Al Hussein* and *Al-Hijarah* would have provided the Iraqi missiles force with the range, accuracy, speed and

⁵ The MILAN is a French acronym meaning “Missile d’infanterie léger antichar.” The literal English translation is “Light anti-tank infantry missile”. The British SAS teams used these light weapons to target and destroy the Iraqi TELs.

numerical saturation required, achieving the strategic goal against Israel and greatly challenging the US Coalition's strategic approach.

Gain & Maintain [Information+ Air+ Fire Superiority] = “*Decision Superiority*”

The goal to gain and maintain information superiority, air superiority, and fire superiority required the maintenance and protection of the Second Off-Set's three pillars. The US Second Off-Set strategy is heavily dependent on intelligence gathering for information preparation of the battlefield (IPB), in order to deliver decisive waves of precision guided munition (PGMs) from a variety of delivery systems across all domains, enhanced by a C3 architecture that detects, targets, engages and accesses any dynamic target (DT). The failure of miscalculated short range ballistic missile (SRBM) capability, espionage, poorly constructed architecture and an extended kill chain caused the United States to lose information superiority, which degraded air superiority and the concept dynamic fires. Both efforts of the Desert Storm Scud Hunt, Phase I: Air Campaign and Phase II: SOF Infiltration was a game of luck, chasing a rapidly moving needle in a vast haystack. The combined concept of secure and accurate IPB for effective PGMs supported by rapid C3 that allow fast DT and destruction and defeat.

These integrated elements of battle create the foundational pillars of successful employment of the Second Off-Set strategy. US modernized strategies, or third off-set concepts, must master the integration of these elements along with the synchronization of information across the cyber domain with the ability to adapt rapidly to evolving information and threat behavior. Next the mastery of C4I architecture must facilitate accuracy, speed and threat annihilation. The Desert Storm case study unveils the key to future A2AD capabilities and weight of

conceptual development considerations for Manned-Unmanned Teams (MUMTs) on the battlefield. However, Desert Storm exposed a weakness in the US high tech means-based strategy versus an aged and low tech strategy such Theater Ballistics Missile (TBMs). The Second Off-Set prove to be vulnerable to a mixed missile defense. Iraqi modified TBMs provided 1,000km range area of influence, compounded with the highly mobile TELs and rapid reload proved to be an anti-access area denial measure. This world-wide display of TBMs strategy influenced a surge mixed missile proliferation. Many countries found it cost effective to invest in indigenous modifications for a nation specific Scud force, creating a “poor man’s air force” and an effective strategic deterrence capability.

The delineating value of an A2AD “peer defense” structure versus an A2AD “near-peer defense” structure depends on the ingenuity of the engineers’ ability to capitalize it’s rocket science in the vital area that Saddam Hussein overlooked; highly precise and highly destructive warheads. Without a creditable warhead, numerical saturation of Scud launches is a short lived operational victory wrapped inside an overall campaign defeat. Countries that have mastered the innovations required to build TBMs with precise and destructive warheads recognize the value of their nation’s defense and protect these systems with a robust layer of IADS to target airborne threats and Coastal Cruise Missile Defense systems to keep surface ships at range; advanced A2AD. The peer-countries that have done this well are Russia and China, the near-peer countries that have come close include Iran and North Korea.

Post War Lessons Learned - John Boyd's (OODA Loop) Strategy:

To the Swift Goes the Race

The post-war declaration of victory was followed with a sequence of celebratory events meant to infuse a national revival of military strength and global confidence in US dominance. The United States eradicated the region's tyrant in what appeared to be a swift and near bloodless battle. Broadcasts of military successes with speed promoted the utility of the new technologies debuted in the Gulf War as the essential element needed to maintain the asymmetric advantage, the Second Off-Set. However, thorough review campaign actions were required to capture true lessons learned and determine the future path of success. The first account of post-war lessons learned was presented during a monumental congressional address led by USAF Col (Ret.) John Boyd, on September 30, 1991.^{xcvi} During the Desert Campaign, Boyd was the Chief Military Adviser to the Secretary of Defense, Dick Cheney. Boyd was critical of the decisive strategy, designed to employ the essence of his cognitive model, Observe, Orient, Decide and Act (OODA) loop.

Implementation of the Desert Storm Strategy was transported by the traction gained from the friction incurred by many innovators of the 1980s. Most notable was the contribution of Colonel Huba Wass de Czege, who led the Army's revision of FM 100-5, maneuvers warfare in 1982 and founded the School of Advanced Military Studies (SAMS), Fort Leavenworth, Kansas which produced the legendary "Jedi Knights," General Schwarzkopf's campaign planning team.^{xcvii} Boyd praised this team for its ability to observe, orient and re-orient in a way that injected uncertainty, ambiguity, confusion and paralysis. While the world marveled over the high tech C3 systems, IPB through sophisticated Intelligence, Surveillance, and

Reconnaissance (ISR) and the rapid stream of paralyzing fire power, Boyd reminds congress that no tool or high tech weapon system can substitute for sound strategy.^{xcviii} The Gulf War victory was delivered by commanders who possessed the ability to demonstrate “Decision Superiority” over the adversary.

Renewing the US Concept of Strategy:

(Means-Based =Sum) vs (Ways-Based = Product)

The Gulf War victory was an example of the Second Off-Set strategy in action, a modern marvel of military weaponry, optimized by a new way of war. The three pillars of the Second Off-Set, intelligence for IPB and ISR, C3 Architecture for centralized authorities, and PGMs for massive and decisive fire power, would have been useless without agile and adaptive actions for fast paced decisiveness. The adaptive approach that led the teams to pivot from preplanned strikes on fixed sites to Scud Hunt Phase I: Air Campaign then quickly moving to Phase II: SOF Infiltration. This display of rapid cognitive course orientation serves as the foundational principle of Boyd’s Grand Strategy. It is the way of war that allowed the United States to outpace and out maneuver any adversary mentally, physically and morally.

US strategist must pursue future concepts for systems supporting the Third Off-Set capability. The operational design teams must ensure new components enhance the three pillars of the Second Off-Set by extended range, redundant layers of multi-domain defenses and rapid employment of high yield destruction capabilities. The pursuit of a Third Off-Set does not negate the relevance of the First or Second Off-Set. Instead the Third Off-Set seeks to seal the vulnerability gap, reduce risk and uncertainty while fueling velocity to increase decisiveness, tempo and

positional advantage. Imagine the evolution of the next Off-Set as a three-legged stool, where *ends*, *ways*, and *means* each represent a leg of the stool. Collectively each leg works to stabilize the overall “strategy. If any leg is too long or too short in relation to the others it creates instability which represents risk. The three legged stool analogy is a derivative depiction of the Colonel Arthur F. Lykke Jr.’s description for military strategy. COL Lykke’s formula states the strategy is the sum of *ends* (objective, goal or desired effect), plus *ways* (course of action) plus *means* (instrument, assets or resources proved or deemed necessary to achieve the defined end); [*Strategy = Ends + Ways + Means*].^{xcix} Now rethink strategy beyond Lykke’s formula which considers strategy as an action that capsulate the cumulative attributes of what *ends*, plus *ways*, plus *means* does, create a product in motion. Next reorient strategy, as an integral approach for synchronizing Third Off-Set attributes with existing Second Off-Set systems. A close consideration for the essence of strategy yields a new formula that produces a product versus a sum; [*Strategy x (Ways + Means) = Ends*]. Reorienting strategy as a product based-function moves strategist and planners away from the traditionally flawed “*means-based*” approach that caused pressures political leaders commit means that out way the gain, evident in both Vietnam and Afghanistan.⁶ Strategy is a product that delivers *ends* inspired by a creative construct that allows decisive fluctuation.

Additional value of reorienting COL Lykke’s formula from a sum to a “product-based” function creates an algorithmic model that creates interchangeable variables

⁶ GEN Westmoreland Requests 206,000 more troop, stirred up great debate among advisers of the Johnson administration, the request was too great for political interest and therefore denied. Most recently GEN McChrystal’s request 50,000 troops was too great and political-military compromised was reached with by adding an additional 30,000 troops instead.

proportionately affected by the increase or decrease of *ways* and *means*. Strategy in its pure essence will yield the desired *ends* despite limitations or constraints of *ways* or *means*. This outlook is supported by the combined definition of Barry Posen and Eliot Cohen, who provide a working definition of strategy: “strategy is a theory of success”.^c This reoriented formula and refined definition is an important step towards the consideration of Third Off-Set synchronization. Strategists, developers and planners who fail to pause and reorient the current “square peg” architectures, intelligence functions and fire concepts integrated under the Second Off-Set design could become stalled when faced with advanced spherical layers of an A2AD “round-hole” threat.

To avoid “theory of success” barriers, one should understand the fundamental nature of theory. Clayton M. Christen and Michael E. Raynor define theories as the predictions of actions that lead to results linked by “what” and “why.”^{ci} Historical the Gulf War Campaign linked the importance of creating a shield prior to the storm. Major campaign plans must consider the ability to sustain a “shield” of defenses over priority spaces that will allow forces to build and carry out the “storm” that brings information superiority, air superiority, and decisive actions through rapid, precision guided munitions. The theory of success for Third Off-Set, enhance by Manned and Unmanned Teams (MUM-T), requires new systems to synchronize with current Second Off-Set architecture and accelerate the loop of decisive actions to yield “Decision Superiority.”

The product-based approach to developing theories of successful synchronization for MUM-T systems and Second Off-Set architecture does not

occur in absence of an unfolding strategy of the global nuclear deterrence. This First Off-Set strategy, adopted by the Eisenhower Administration in the 1950s to offset the overwhelming numerical advantage of the Soviet land forces was neutralized. Deputy Secretary of Defense, Robert O. Work, “the fact that we were planning to drop so many nuclear bombs everywhere...provided a credible deterrence.”^{cii} Nuclear weapons provided an unmatched asymmetric advantage that was cost-effective and strategically effective in deterring a numerically superior conventional forces. The 1968 the international community response to promote peaceful issued the Non-Proliferation Treaty (NPT), whose goal was to promote the use of nuclear power as an alternate energy source, rather than a weapons capability. ^{ciii} The NPT continues to be widely accepted and supported by almost all United Nations members with the exception one openly defendant nation, North Korea.

North Korea’s original defiance is attributed to a legitimate critique of the NPT, which only recognizes countries who have successfully tested nuclear weapons before 1968 as nuclear states; elevating the United States, Russia, France, United Kingdom and China. North Korea acceded the NPT in 1985 and withdrew completely in 2003, after the pre-emptive invasion of Iraq in pursuit to halt the nation’s ability possess weapons of mass destruction. North Korea began nuclear test in 2006, 2009, 2013 and 2016. Currently North Korea is suspected to possess an inventory of 15-22 tactical stockpile and 10-16 strategic arsenal with a maximum missile range of 4,000km.^{civ} The shift of North Korea’s defiance and willingness to employ its arsenal gives the nation a power offsets that destabilizes diplomatic

solutions. With diplomacy impaired, heavy focus is given to military power. The regional military strategy must remain in a pre-planned posture of readiness for rapid de-escalation of unpredictable provocation. If de-escalation fails, the North Korean regime would face a technically advanced conventional force with combined U.S.-Republic of Korea (ROK) leadership of over a dozen coalition partners. But the isolation of North Korea from China and buildup of forces within key South Korea bases requires a strategic approach that expands the national instruments of power. Lawrence Freeman states that strategy in action is “the art of creating power.”^{cv} The current and future strategy for the nuclear armed North Korea regime, must preemptively provide the sequence of the Gulf War Campaign; a defensive “shield” and an aggressive “storm.”

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA (DPRK) WAY FORWARD

(Rethinking the US- DPRK Strategy)

Future United States strategies must integrate Third Off-Set advancements in a ways-based approach with a product that yields a full spectrum of creation and expansion of power. No nation agitates the urgency of this shift like North Korea. Secretary of State Clinton introduced the course of “strategic patience” to assure the six party allies of Asia, while simultaneously engaging in US-DPRK bilateral meetings to negotiate a plan for denuclearization. However, all progress was derailed after the death of Kim Jong-Il. Strategic Patience did not seek to denuclearization the DPRK, instead it sought to demoralize them for acting in their self-interest and isolate them from their neighbors, primarily China. For eight years of implementation the strategy achieved its goal with expanding success. However,

the effects of the continuation to develop its nuclear arsenal, compounded with its ballistic missile advancements threatens the region stability and challenges the global world order. Successful launch of a three-stage rocket from its Sohae launch facility directly violated UN Security Council Resolutions 1695, 1718, and 1874 which prohibited North Korea from conducting any tests using ballistic missiles technology.^{cv} Kim Jong-un used the ballistic missile development as an opportunity for public defiance to deliver assurance to his father's regime and the grief stricken nation, that their new leader may be young but he was strong and fit to move the nation forward. DPRK continued nuclear development and ballistic missile modifications that directly violated multiple United Nations Resolutions taunting the international community as "an organization without teeth."^{cvii} In 2012 the Obama administration unveiled its "smart power" approach to integrate diplomatic strategies that would encourage multilateral solutions manage conflict and promote stability. This "smart power" resolution became the framework of the Pacific Rebalance, a pivot to commit more emphasis on the preservation and protection of the region's national interest.^{cviii} While the regional and international community worked towards the strategy of patience, North Korea has advanced its military capability under international pressure and regional isolation. Hopes of peaceful unification agreements faded with impeachment of the 2017 Republic of Korea's President Park Geun-hye. A new strategy for the growing threat was required and the diplomatic navigator that kept "Strategic Patience" on course was abruptly removed. Additionally, United States election of President Trump brought promises pivoting towards isolating policies that put America first.

Current Situation of US-DPRK Tensions 2017: “The End of Strategic Patience”

In March 2017, Secretary of State Rex Tillerson declared the end of “Strategic Patience” putting all options on the table.^{cx} Simultaneously, ending the isolation of North Korea and closing that gap between Pyongyang and its Beijing partnership. After the US launched 59 Tomahawk missiles into Syria, demonstrating the US will to act unilaterally and no longer lean towards the “smart power” base of multilateral resolution. The US has moved its carrier strike group into position, carrying over 160 Tomahawk Missiles per ship. The DPRK-China reaction rapidly activated the overlapping Integrated Air Defense Systems (IADS), moved DPRK military into a forward alert position, supported by over 150,000 Chinese soldiers along the border, while immediately evacuating over 600,000 residences from the capitol city.^{cx} North Korea Foreign Ministry asserted, “We will hold the US wholly accountable for the catastrophic consequence to be entailed by its outrageous actions.”^{cx} Chinese President Xi claimed the Asian people will stand united against President Trump, “a weakened politician” looking to “flex his muscles.”^{cxii} With all options on the table, US leaders must determine how much of this tough talk reflects the national security strategy or merely demonstrates an opportunity to create or expand its power base.

The DPRK-China Alliance’s demonstration of nationalistic rhetoric, corresponding action, and historical alignments has boosted their diplomatic influence and popularity among their populace and regional neighbors. This corresponds to Freeman’s observation that strategy in action is the “art of creating power.”^{cxiii} Now that the world recognizes the DPRK as a nuclear power, adversaries

must examine the doctrine and alternative means in which they plan to use this newly acquired power. One common approach is the known as the “*catalytic strategy*”, designed as an international tool to draw one or more great powers to intervene in a conflict or crisis to restrain adversaries and restore stability.^{cxiv} This is the most peaceful use of their nuclear gained strategy, to ensure the provocative actions that challenge the peninsula’s Armistice Agreement are not dominated by the presence of a single super power, thereby denying the United States a monopoly on victory. The second and more consequential approach is the “*retaliation strategy*” which is amplified by a leader’s will to employ their nuclear arsenal, thereby deterring high-end retaliation.^{cxv} The final strategic consideration for DPRK’s approach to nuclear power is to employ it as a “*war-fighting instrument*” that off-sets conventional inferiority and uses it as a first strike weapon, similar to the US First Off-Set approach.^{cxvi} The catalytic strategy reciprocates and levels the interest of deterrence, while the retaliation strategy amplifies challenges to defense architecture, which yields no universal theory of success once the ultimate catastrophe of nuclear weapons are fired as a first strike war-fighting tool.

Rethinking the North Korea Plan: Synchronizing the Third Off-Set Strategy

The US must determine a new course and new policy that will create or expand power before utilizing all options on the table. The theory of success in North Korea, like the Gulf War Campaign, will be a phased approach that incorporates a shield to storm strategy. This theory of success was tested in a widely disseminated Operational Decision Game (ODG), “North Korea Now – 2020.” The ODG future situation and narrative predicts the climax of DPRK-US tensions to collide in either

2018-2020 scenario. Pivotal considerations were made to advance the DPRK arsenal with Chinese off-road, all terrain TEL WS-2400⁷ as well as the DF-15 and DF-21. The advantage these small contributions provide to the DPRK capability is a ballistic missile that can be rapidly fired, carry 1,000 lbs of ordinance, and hit within a circular error of probability (CEP) of one meter accuracy. In short, these systems create a modernized and matured Scud Hunt that out performs the three pillars of the Second Off-Set; is mobility in mountainous terrain through multiple hid sights will greatly deceive or deny detection; the precision, weight and redundancy of the systems to saturate a single target may degrade the sight capabilities or destroy its infrastructure until regeneration can be achieved and finally the missile delivery systems negate the defensive alert package for sights and targets beyond the defended access list (DAL). The game challenges military planners to think of MUM-T systematically to create a Third Off-Set shield that will expand a coalition's maneuver space and allow Phase II, Seize the Intuitive for a "storm-like" offensive.

SME SELECTION AND ODG PARTICIPANTS:

Game participants were selected based on their level of experience and familiarization with Korean Peninsula defensive and offensive Operations Plan (OPlan). The targeted disciplines were Army ADA, Joint Fighter Community (Marine F-18, Air Force F-16), Joint Intelligence Officer (Korean ISRD, Chief of Plans), AF-Space Weapons Officer (Korean STO), AF-Cyber Planners (Korean

⁷ Very credible 8x8 special heavy-duty truck developed and built by Wanshan Special (WS), used by the People's Liberation Army of the People's Republic of China as a transporter erector launcher (TEL) platform and is a reversed engineered version of the MAZ-543 missile used during the Gulf War Campaign.

7AF/A6 Plans, 7AF/Spectrum Manager, AFCENT CTO Chief), Korean-Air Operations Center/Senor Air Defense Officer, (AOC/SADO), Korean-Air Support Operations Group/Director of Operations (ASOG/DO), and current Korean-Sector Air Defense Commander (ACS/CC). The review of the ODG presented the team with an accurate, open source Order of Battle enhanced only by China's WS-2400 TEL, DF-15 and the DF-21 series. The challenge of the scenario requires the game players to solve three tactical problems and apply elements of operational art to determine which MUM-T systems should be moved the Peninsula to strengthen the detection and protection shield. The final phase of the game requires the planners to develop synopsis of the central idea or chief concern.

The Operational Decision Game – N. Korea 2020

(SME MUM-T Gap Analysis)

The situation of the ODG presents each player with realistic challenge of de-escalating tensions, maintaining Armistice conditions. It is here that each subject matter expert would prepare a gap analysis for their respective Component Commander to present to the Combined Force Commander/United Nations Commander (CFC/UNC). The 7th Air Force Commander, is the Commander of many spheres, the Deputy United Nations Commander, Area Air Defense Commander (AADC) and Combined Force Air Component Commander (CFACC). The pre-positioning of defense assets, alerts and authorities are built with the assumption that China will remain neutral. This diplomatic assumption is also the Phase II frame work, for the combined storm-like offensive built to take-down DPRK in a matter of days and transition to Phase III domination. But the current state of the Peninsula, shows an effective use of the nuclear driven catalytic strategy, which

draws great power intervention such as China, to support during high events of heightened tension or crisis. The assumption of China's neutrality makes current on-the-shelf plans vulnerable to disruption due to flawed with miscalculations. The CFACC/AADC demands an immediate proposal that identifies the gaps and vulnerabilities of China's troop commitment and the missile force enhancements. Below is the proposal summarized from the inputs of the Subject Matter Experts (SMEs) synopsis of the ODG.

US ARMY AIR DEFENSE ARTILLERY (ADA) – identified multiple gaps and limitations that leave high value assets and high populated areas un-defended due to the inability of the defense assets to intercept Maneuverings Re-entry Vehicles (MaRV), Early Release Sub-munitions (ERS) and mitigate effects of chemical biological or nuclear burst. Next with the value of this limited assets being identified, it is also important to build complimentary defense units for these low density machines.

JOINT FIGHTER COMMUNITY (MARINE F-18, AIR FORCE F-16) – identified the need to preposition 5th Generation assets on Peninsula, possibly spending up the exchange or purchase for the Republic of Korea's homeland defense fleet in an effort avoid the appearance US provocation. Next, a mixed Viper Fleet (Block 50) or forward operating base for Marine Growlers and Prowlers (EA-18G/EA-6B), keeping the footprint relatively stability but forward ready posture of full offensive strike requirements.

JOINT INTELLIGENCE OFFICER (KOREAN ISRD, CHIEF OF PLANS) – identified the importance of slowing the Scud attacks (conventional or nuclear) will require detecting the mobile launchers and engaging in single digit minutes. Detection will require overflight, which requires a degree of Air Superiority. Declaration of Air Superiority requires a degree of confident assessment for the operational status of IADS, activity and strength of the 4th Generational fleet and airfields, as well as, the possible dispersal locations of AN-2/Colts. Then we can began to target the missile force fixed site, unlike the Gulf War fixed sites these will require a lot of work. Detection and BDA is difficult, few ISR platforms pose the ability to self-defend and must honor the keep-out range of the SA-5s until assessed. Collectively this make detection geographically limited and difficult, against an aggressive weapon laydown which requires detection target.

AF-SPACE OFFICER (KOREAN STO) & AF-CYBER PLANNERS – identified the need to employ Non-Kinetic Weapons (NKO) sooner than later. But without rapid kinetic sessions the effect will trigger retaliation and allow regeneration and repair. The EM-Spectrum is saturated, Data-Links Networks for Armistice can handle a wartime capacity and MILSAT terrestrial constellations for the Peninsula cannot handle current demands, leaving theater authority for use at the PACOM level.

KOREAN-AIR OPERATIONS CENTER/SENIOR AIR DEFENSE OFFICER, (AOC/SADO) – China interventions renders the original mandate for the First Off-Set strategy. US retaliation must incorporate highly explosive and destruction munitions to thwart the numerically superior threat. To revert back to a nuclear exchange would demonstrate inconsistency with our global stance. Although, the proportionate exchange between the US stockpile of 4,500 warheads versus the North Korea budding capability ranging from 10-22, would result in a short exchange but the China factor is a considerable deterrent. A more moral solution would be the employment of the GBU-43, Massive Ordnance Air Blast (MOAB). The Second Off-Set architecture worked in the vast, densely populated deserts of the Gulf but the EM-Spectrum is strained in a contested, congested, high tech culture such as the Republic of Korea and Greater Seoul Metropolitan Area. The kill chain between Early Warning units and rapid fire systems has achieved a minimum decrease of 50%.

KOREAN-AIR SUPPORT OPERATIONS GROUP/DIRECTOR OF OPERATIONS (ASOG/DO) – MUM-T offers fresh solutions to aged problems. Low level detection, met with a heavy range of fires can be brought to bear by the most recent US-ROK integration was the introduction of the CAV's Heavy Armed Reconnaissance Squadron (HARS), pairing AH-64D Apaches with various UASs such as the RQ-7B Shadow and MQ-9 Reaper. But like the challenge of most Third Off-Set concepts, they become challenging to incorporate with existing Second Off-Set architectures, rather than focusing on MUM-T tactics the unit invested months in frequency allocation, interrogator registry, base bed down and airspace de-confliction. No easy hurdle in a contested, congested environment.

The CFACC/AADC concurs with the gap analysis and synopsis of the SMEs, and must brief this information to the UNC/CFC. Upon the synopsis summary provided by all Component Commanders the UNC/CFC determines that the US Forces of Korea (USFK) are not “ready to fight” and win against the combined threat that the China-DPRK forces present. UNC/CFC urgently briefs this information to Secretary of Defense, James “Mad Dog” Mattis who in February 2017 reaffirmed the Republic of Korea that gaps in missile defense would be filled within a year's time.^{cxvii} With mounting tensions and Chinese collaboration, Secretary Mattis must consider methods of acceleration. Secretary Tillerson remains firm on his stance to end the strategic patience and keep all options on the table. Together the Secretaries garner

congressional support to strengthen the shield of South Korea, by synchronizing prioritized systems that will enhance detection and amplify shooter engagement. The scenario frames the SMEs mission to build a comprehensive defense plan that delivers an updated DAL, modernized Family of System (FoS) Architecture and a lethal interface of stand-off fires.

The update restrictions to the Defended Asset List (DAL), required SMEs make tough decisions as to which assets get covered. The strategic approach to this problem forces the players to employ creativity and a ways-based product, rather than request more means. One challenge currently requiring resolved on the Peninsula is the electro-magnetic interference the Patriot and THAAD units create in a congested environment, especially a busy airfield. In short the future of American strategy is not a request for more assets but creative plan to employ innovation. The synopsis of the DAL build:

US ARMY AIR DEFENSE ARTILLERY (ADA) – The true source of success will be the protection of the APODs and SPODs. In any possible course of action, nuclear or conventional, the momentum of battle will favor he who can sustain fire, through rapid reloads requiring repaid resupply. Logistics and the flow of forces is require to transition from the protected shield to the massive offensive storm of Phase II. Additionally, the US Patriot Batteries would typically protect the Air Operations Center as the DALs top priority. The game does not yield this result, because the strategic priorities UNC/CFC list the US-ROK alliance as the operations center of gravity. Military targets will be sacrificed to save civilian life, particularly in the Greater Seoul Metropolitan Area (GSMA). The Korean Air Operation Center, is a Harden Tactical Air Control Center (HTACC). The semi-sublevel facility is re-enforced with multiple layers of concrete and steel to absorb direct attacks.

JOINT FIGHTER COMMUNITY (MARINE F-18, AIR FORCE F-16) – The disturbing options of DAL prioritization left many pre-planned forward bases off the defended list. First alternative is to seek employ-to-deploy permissions from Japan. Unfortunately the scenario does not allow such permissions. The act employment of war-planes from Japan would cause Kin Jun-II's regime to treat Japan as a non-neutral state and retaliate with ballistic missile strike and possible a nuclear strike. The risk is not worth the reward. The denial of employing from Japanese bases truly strengthens the

Arial Denial aspect of North Korea's already robust A2AD threat. The second alternative would be to delay forward bed down and Phase II's H-Hour. This puts further emphasis on the strength of South Korea's defense shield, to do more than block but also tackle.

KOREAN-AIR OPERATIONS CENTER/SENIOR AIR DEFENSE OFFICER, (AOC/SADO) – The real key to managing the DAL in a way that secures the low priority yet critical assets with a limited amount of resources is facilitating rapid retaliation that allows a return of fire to either the TEL, Support vehicles of fix sights. Once the missile force pre-orchestrated strike pattern is disrupted, degraded or denied. The reshuffling of defense capabilities must occur. Supporting requirements include early warning and high fidelity location detection that triggers precision shooter capabilities in single-digit minutes.

The defense of the DAL, creates a prioritized shield over critical assets that can be covered with the limited Peninsula system, as well as, the east and west sea U.S.-ROK BMD Navy Fleet. The defensive shield is paramount to securing the physical, mental and moral essentials of victory, creating power through momentum in this phase is the essence of Korea's overall theory of victory. The DPRK nuclear status and wiliness to employ these warheads as a first strike weapon tilts the scales of power creation in his direction initially. Rhetoric implies plausible deniability for massive infliction of catastrophic casualties on the South Korean people, he has selected a plea of self-defense towards US aggression. However, once he employs the deadly weapon, he risks a return of isolation, which would led to rapid capitulation by the U.S.-ROK led coalition.

The success of the DAL and Fires construct is heavily dependent on the Framework of the Third Off-Set synchronized in a harmonic Family of Systems (FoS) Architecture. This concept elevates the Second Off-Set pillar of C3 Architecture to the consideration C5I, (command, control, communication, computer, collaboration and intelligence). This becomes increasingly challenging

on the Korean Peninsula, due to the contest and congested battle space, heavily populated area, and saturation that limits spectrum management. The ODG highlight the ROK initiative to enhance multi-domain synergy and synchronize a (FoS) that will sustain the requirements of Korea's contested-space orbits, counter-air, TBM, EW-Cyberattacks against key C2 networks and a range signal threat. In an attempt to avoid strategic pitfall of means-based approach. The SMEs were limited to the integration of current Peninsula systems with one high-end terrestrial assets, the Joint Space Operations Center Mission Systems (JSpOC/JMS) and one high-end aerial assets, the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS). The SMEs will look at the gaps originally identified, the two high-end additions and now build in the support systems with require interoperability to enhance Korean Theater of Operations (KTO) multi-domain, synergy and speed, connecting sensor to shooter for engagements occurring within single digit minutes.

The synopsis of the FoS package design:

JOINT INTELLIGENCE OFFICER (KOREAN ISRD, CHIEF OF PLANS) – The main efforts of ISR in Phase I are detection, early warning and assessment but several supporting efforts are required to ensure that these functions are adequately addressed. For Korea, aerial detection of low level craft performing SOF insertion and slow prop bombers remain challenging. Additionally, EW for TBM launches remains space base dependent due to the significantly truncated launch sequence (< 15 minutes) and missiles bodies fueled with solid-state accelerants, denying little to no pre-launch warning. In general, the top supporting effort is assurance that the architecture can facilitate massive amount of diverse intelligence requirements. Intelligence SMEs remain dedicated to finding ways to incorporate “big data analysis” with automated data visualization, machine learning capability and AI aided fusion. DGS remains the chief fusion and control center. The DGS-K will remain under the hardened protection of the HTACC.

The Navy research center continues to pursue mobile DGS employment. The mobile nature captures the intent of the original design. However, the current DGS-X has flourished into a species unimagined or unintended but absolutely necessary. The enterprise currently feeds large amounts of data into the fixed DGS to support the respected theater of operations, as needed.

AF-SPACE OFFICER (KOREAN STO) & AF-CYBER PLANNERS – Modern architecture designs tend to pursue a unanimous umbrella cooperative control functions that creates key holes and locks to protect information. Another concept is multiple nodes of autonomous networks with push pull capability rather than a unanimous cyber skeleton. There is no right or wrong to the design but there is no one size fits all solution. Meaning the KTO may have protection mechanism that does not fit Japan. However, Hickam will need to see them a Common Operational Picture for both designs.

From a blue hat perspective, uniformities and mass integration of an one umbrella type system is the predominately idea for easy HMI, speed of sharing and compatibility of data. However, from a gray hat perspective the question is not how do hack into this system but when, and once I'm in what do I want to do; exploit, deceive, disrupt or destroy. For Korea, the complexity of overlapping missions, areas of operations, and coalition sharing agreements make a one singular solution difficult. The UNC/CFC want the ability to manage his force in Armistice conditions as well as war. Supporting the JSpOC/JMS with Global Positioning and Navigation Systems (GPNS) through Accelerated Capability for Testing and Integration of Nanosatellites (ACTION). The JSpOC + GPNS + ACTION = mitigates errors and delays in detection, EW, and the need for aerial asset tracking, which also compliments the JLENS advanced detection capability. For Network support, the Stochastic Compiler Hacks as Software Immunization Mechanisms (SCHSIM) and the Networking on the Move (NOTM). These two create a mobile data share option with multiple security mechanisms.

KOREAN-AIR OPERATIONS CENTER/SENIOR AIR DEFENSE OFFICER, (AOC/SADO) – As massive amounts of data fused within the AOC and DGS, require changes to mission command orders. The flow of forces, facility status, and alert postures can drive rapid changes to the theater posture, ROE and the overall scheme of maneuver. The Family of System concepts should by any procurement team seeking to bridge branch of specialty gaps with system that are not compatible of interoperable with the joint Family of System (FoS).

The Family of System package built during the ODG by each respective SME is the architecture that capsulate the solution for rapid and precise fires, for and endure exchange of massive volleys. The rethinking of A2AD challenge being met with an overwhelming Third Off-Set solution, won't yield confident deterrence until the United States promotes an asymmetric fire advantage that demonstrates the ability to deliver ordinance downrange with speed, precision, shock and surprise. Game players and real-world planners alike must take a hard look at their FoS

design to ensure they have the right sensors bridged by terrestrial and extraterrestrial constellations to interlocked and synchronized “big data” collections, fused, filtered and prioritized with the assistance of AI, machine learning and automated collaborative sharing for rapid assessment and immediate targeting. Target destruction remains the foundational objective to demoralize the adversary by physical and mental paralysis. These are the strategic considerations that framed the concept of future fires with MUM-T system integration. The synopsis of the modern concept Fires Interface package design:

Selection of heavy [Missiles (RV)/ Rockets (Hi & Low) /Bombs (Dumb, GBU/MOA)]

US ARMY AIR DEFENSE ARTILLERY (ADA) – The defensive fire interface cannot be pure Air Defense Heavy. It would be most advantageous to co-locate fire systems such as the PATRIOT (Phased Array Tracking Radar to Intercept on Target), THAAD (Terminal High-Altitude Area Defense), HAWK (Homing All the Way Killer), with protection from Indirect Fire (IDF) Attacks using MLRS and HIMARS. Both Army and Marine Corps have move toward M777 ordinance solution. If the FoS are designed to feed accurate “Point of Origin” and use “Fiber” cable for communication support to avoid jamming or interference. These rockets become a valuable layer of defense for the High Value Missile Systems.

For the Korean heavy artillery threat range GSMA, the deployment of the advanced MUM-T near-autonomous solution to IDF is the C-RAM (Counter-Rocket, Artillery and Mortar), fires 75 rounds/second using 20 MM High Explosive and it is compatible with the future IBCS. Additional, as 8th ARMY moves forward to secure territory and possible nuclear sites. This would require rapid PAR Sweeps, using an RPA with “Geiger Counter” capability provide the mobile ground force an area sweep on the move for detection of (alpha, beta and gamma radiation particles).

JOINT FIGHTER COMMUNITY (MARINE F-18, AIR FORCE F-16) – Fires is the solution provided by a maneuvering scheme carefully build to “peel-back” the threat. Kim Jun-Il relieves the nukes will be eradicated within the initiation hours of conflict, he must employ a “use-it or lose-it” nuclear strategy. Ultimately, this is a shift to the current planning assumption. The old assessments predicted use of the non-conventional biological, chemical and nuclear arsenal, to be used as regime protection tool, launched only if the Pyongyang Capitol is threatened. But current rhetoric, launch range and delivery mechanism indicate the possible employment of nukes as a first strike weapon. This threat won’t slow down air campaign or the “peel-back” scheme of maneuver used to take-down IADS, take-out Coastal-CMDS, attrite their air forces. However, if the

limited launch and land capability on the Peninsula is degraded by chemical & biological hazards or destroyed by a nuclear launch. The momentum shifts, to exchange of ground fires that can hold to shield until repairs and regeneration of facilities yield a functional capability.

The advance scheme would require lanes and gaps to be opened by TLAMs/SLAMs, and the Army's new Multi-Mission Launcher (MML), aided by a high altitude cueing radar (possibly JLENs or 5th Generation capability). The rapid and massive transit of the Guam Bomb fleet (B-1 Lancer, B-52 Stratofortress, and the B-2 Spirit) is critical. The destruction of the DPRK's rear-postured arsenal (Taepodond-2's fixed-site, Pukguksong-2 fixed-sites, and Musudan BMOAs) are all prime targets for the MOAB if the China border agreements and collateral restrictions are off the table. This allows a destructive pattern bob raids in the rear, while missile forces degrade capability of forward unit movement and communication, inducing confusions, and rendering defeat.

KOREAN-AIR SUPPORT OPERATIONS GROUP/DIRECTOR OF OPERATIONS (ASOG/DO) – Shift the traditional concept of air integration mechanisms that feed the fire control measure that deconflict fire effects. In the Korean congested and contested spaces, “the enemy gets a vote.” The shift requires planners and battel managers to re-think of fire integration measures, cooperative data sharing connectivity, target cueing support and applying a mass, mix, and integrate compilation to ensure continuous tracking with high identification fidelity. Traditionally, the high sky is owned by the high value ISR assets, placing the C2BM, EW and Air Refueling in the center blocks. Low air space has been a negation for coordinating altitudes that separate fixed wing from rotary wing assets. The new integration of HARS formations, low altitude RPAs and all altitude capability of the F-35 (JSF) requires a paradigm shift. When considerations are given to SLAMs/TLAMs and MMLs firing from all directions with varying trajectories while opposing fires from TBMs, LRA, and various IDF systems. The neatly constructed lanes designed to deconflict fires and transits routes vanished under a sky covered by saturated two-way volleys of high-low altitude trajectories from short-medium-long range missiles and rockets.

New C2BM, FECC, and AMCC systems would be require to support the overwhelming data saturation and human error. AI aided systems remain in the experimental phase of devilment, however they are the cradle and mainframe manifold for any advancement of future Fire Interface designs.

The conclusive results of the Operational Decisions Game (ODG) points towards one consensus; the Third Off Set inclusion of MUM-T systems should build on the momentum of current Second Off Set architectures. The time to field solutions MUM-T enhancements that deliver on-hand capabilities for on-time success of

future battles is today. The DPRK provocations highlight the need to acceleration missile defense shields capable of deterring nuclear warhead detonation and destruction of US forward deployed facilities or a massive massacre of the region's civilian population. It is North Korea's combined effect of ballistic missile, cruise missile and nuclear arsenal operated under an umbrella of integrated air defense systems protected by fourth generation aircraft that denies US power projection capability and diminishes the assurance of the US alliances. The forward of military assets must warrant a creditable response of force when the threat of force fails to deter DPRK's offensive and deadly acts. The leadership of the Pentagon's development teams needs to articulate a clear vision for sustaining US technological superiority while enhancing current systems with MUM-T and technical solutions that defend assets in place while denying competitors and adversaries the effectiveness of their Anti-Access Area Denial strategies.

RECOMMENDED SOLUTIONS

The growing tension on the Korean peninsula ignites an already existing urgency for MUM-T enhancements to create Third Off Set Strategy; strong defense shields of standoff precision effects. Department of Defense (DOD) acquisition approach to meet the urgency of this need must reflect an intensity similar to the "Manhattan Project or the Apollo Program."^{cxviii} Defense leaders should consider implementing a "team of teams" approach to ensure the acquisition process generates a balanced Family of Systems (FoS) with instant interoperability capable of rapid fires and power penetration across all domains.^{cxix} The "team of teams" model was created by General Stanley McCrystals' staff to leverage success of rapid acquisition for

urgent mission requirements while defeating the inherent bureaucracy of interservice resource competitiveness. The Joint Special Operations Task Force approach relies on the shared consciousness or mind-set for innovation, empowering decentralized decision making, and then being willing to take and reward risk.^{cxx} Additionally, the Air Force Rapid Capabilities Offices, which runs the Long-Range Strike Bomber program, has established rapid acquisition “best practices.”^{cxxi} Collectively, these two acquisition accelerants should be combined to orchestrate a composite solution for the Korean Peninsula.

Select Acquisition Model for Korea’s FoS Solutions with a “Fight Tonight” Urgency

The “team of teams” should be formed under the authority Commander of United States Forces Korea (USFK) and the Commanders of the Combined Component Forces (CFC). The joint staff leaders should be intimately familiar with the coordination responsibility required for combined contributions of the shared OPLAN. This improved “team of teams” assessment is an improvement to the traditional gap analysis that often generates a preponderance of redundant capabilities which can degrade existing systems. USFK/CFC must take advantage of FY16 National Defense Authorization Act (NDAA). The NDAA would support a “team of teams” approach to develop directed-energy, high-speed munitions, autonomous systems, and missile defense technologies needed to counter adversary advantages.^{cxxii} A composite review of the most dangerous and most likely combination a DPRK-China military alliance presents USFK/CFC with a unique urgency to serve as ground zero for the future procurement of US DOD’s MUM-T, Family of Systems, Third Off Set composition.

USFK/CFC participants and planned contributors must build on the momentum of the Korean Theater's current C4I, Area Air Defense Plan (AADP) and power projection forces. The "team of teams" should leverage the fiscal attributes of the current defense budget trends. DOD's FY17 budget request (12.5B), represents a 25-percent increase over FY2000, and also proposes \$64.9 billion for science and technology (S&T) in Future Years Defense Programs.^{cxxiii} Following a visit to the Korean Peninsula, Secretary of Defense Ash Carter stated "these are the issues that keep me up at night".^{cxxiv} Subsequently, Secretary Carter created the Strategic Capability Office (SCO) to rapidly field new capabilities by primarily leveraging existing weapon systems, while recommending \$902 million in the FY17 budget request to support the SCO.^{cxxv} Under the leadership of Secretary Mattis, DOD budget momentum is expected to continue. President Trump proposed a \$54 billion increase to the defense budget, with a three plan to repair readiness, modernize capabilities, and expand in size of assets and personnel.^{cxxvi}

Adjust Plans That Acknowledge Threat; Dispose Disproven Assumptions.

The pre-planned and pre-published shelf plans for the Korean Peninsula must dispose of the disproven assumptions and rebuild with under current uncertainties. In an effort to create a politically sensitive model for the Korea Theater of Operations (KTO) during Combined Exercises, diplomatic assumptions allow commanders to focus on a military scheme of maneuver that attempts to defend when deterrence fails and deescalate whenever possible. The key to successful de-escalation and defensive actions is a continuum of agile defense systems arrayed in

accordance to the Integrated Missile Defense Plan. The ODG denied SMEs the opportunity to create a plan under the following assumptions:

Assumption -1(A1): Although North Korea has possessed a nuclear capability since 2006, the country has no creditable means to deliver a nuclear missile attack. This was disproven by recent assessments that show North Korea's most advanced warhead has achieved the weight of 800 kg, making it small enough to be launched and delivered by the reliable Taepong-1 (1,500 km), Nodong (1,300 km), KN-08 (1,000) which easily puts the major cities of South Korea and Japan within the country's reach.^{cxxvii}

Assumption -2 (A2): Regional Diplomacy and UN resolutions will ensure that China remains neutral to any US-ROK actions taken to defend the Peninsula. This assumption was disproven by recent tension escalations. China responded to US build-up with an increase presence of air and maritime force along the western seas and 150,000 ground forces along the northern border.^{cxxviii} Sim Tack, a North Korea expert and geopolitical-analysis at Stratfor, predicts that China would "definitely react to and try to prevent a US strike on North Korea."^{cxxix} This demonstrates North Korea's ability to execute a catalytic nuclear strategy, drawing in the support or aid of a major super power to counter the other.

Additionally, the China factor proves a reinforced fortification for combined Areal Denial strategy. This is largely due to the strength and credibility of the Chinese missile force. Numerically, the People Liberation Army (PLA) has the capacity to launch missile salvos that exceed the capacity of limited fielded forces, disproving an US assumption carried since the Cold War era.^{cxxx} Additionally, PLA cruise missiles have very deadly anti-ship missile capability found in smart warheads such as the YJ-18 technology whose range of 290 nautical miles launches with a speed of 0.8 Mach and maneuvers and accelerates to 2.5 Mach in the subsequent intercept phase.^{cxxxi} This feature lowers the probability of kill for these missiles, requiring a greater expenditure of the US missile arsenal for defense purposes.

Assumptions -3 (A3): Long time alliance and partnership with Japan has led planner to assume US Forces will be able to employ and deploy from military bases in Japan if executing defensive or supportive mission set. This is critical to acquiring quick turn capabilities for limited support sorties such as ISR, AR, and EW. However, without the ability to fully defend any of Japan's major cities from a North Korea missile attack the country will have little incentive to support an air campaign on the Peninsula if offered neutral preservation for exclusion.

Cumulatively, recent events, assessments and observations have disproven the main planning assumptions that allowed the USFK team to build an on the shelf plan capability rendering success in a matter of weeks. The compounded threat of Chinese troops, PLA-missile technology, and Japanese neutrality, creates a difficult

balance of diplomacy and creditable military strength. Can the team build new plans void of these faulty assumptions that ensure USFK teams are truly “Ready to Fight Tonight?” This is a questions that will be graded at H+36. However, the annual battle rhythm of USFK and its waterfall matrix of force multipliers must sieve the imitative during KA-Hour, the readiness and defensive operations leading up to an overwhelming “storm” beginning at F-Hour.

MULTI-DOMAIN COMMAND & CONTROL(MDC2) ENHANCED BY MUM-T
“Sustains Technical Superiority for Decision Superiority” = A Dominate US Strategy

Multi-Domain Command and Control facilities of the future will rest on the foundation of strong mutually-beneficial partnerships with an array of joint, interagency, multinational, academic and commercial entities. Well-developed trust relationships between leaders, centralized control teams, and decentralized execution in a dynamic future battlespace.^{cxixii} The Air Force future concept proposes a transition from Air Operation Centers, composed of Divisions that generate and manage an Air Tasking Order on a 72-Hour cycle. To the Multi-Domain Operations Center (MDOC). The MDOCs are tailorable to tasks and threats, enhanced with cutting-edge software to ensure a full range of air, space, cyberspace and surface capabilities, effects, and limitations. Dynamic command and control allows joint, interagency, and multinational partners to fully integrate global assets with those already established in a region while balancing strengths of both forward-deployed forces and rear-based nodes.

The USFK FoS approached highlighted the need for robust space mission assurance, including the resilience to operate effectively in this important and

increasingly contested, degraded, and operationally-limited domain. Space situational awareness (SSA) and the ability to coordinate and deliver space effects are crucial for DOD, Intelligence Community, and the commercial enterprise. It is key sustaining the full mission capability within the cyber domain and delivering precession effects to designated targets. Global Integrated Intelligence, Surveillance, and Reconnaissance (GIISR) are fundamental to the joint force situational awareness, conduct and assessment of operational battlespace and the selection of force employment to counter an adversary's action. Information on future battlefields can have no hierarchy. New infrastructure designs will compress Boyd's Observe, Orient, Decide, Act (OODA) loops, and produce actionable intelligence from an enterprise capable of near-instantaneous collection, processing, and dissemination of big data.

Collectively, near-term solutions for Third Off Set Strategies should begin with joint, interagency, and coalition solutions fosters rapid precisions placed effects against adversary targets. Accelerated acquisition of the right MUM-T solution will require a "team of teams" assessment paired with the "best practice" model of the Air Force Rapid Capability Office. The USFK team should include the Combined Forces Commanders, Joint Force Commanders and International Interagency Stakeholders to review mutual Family of Systems (FoS) solutions for the Korean Theater of Operations. New FoS systems should be centralized by a MDOC equipped with harmonized teams capable of leveraging dynamic C2 authorities across all domains to dominate force on force attacks and rapidly render the enemy incapable of continued resistance through precise project power capable of

achieving success in contested and degraded environment against a A2AD defensive layer.

ENDNOTES

-
- ⁱ The Coalition Scud-Hunting in Iraq, (1991), 31.
- ⁱⁱ Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 847.
- ⁱⁱⁱ *Ibid.*, 847.
- ^{iv} The Coalition Scud-Hunting in Iraq, (1991), 31
- ^v *Ibid.*, 847.
- ^{vi} The Coalition Scud-Hunting in Iraq, (1991), 31
- ^{vii} Anthony H. Cordesman, 851.
- ^{viii} Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 850.
- ^{ix} *Ibid.*, 851.
- ^x The Coalition Scud-Hunting in Iraq, (1991), 32.
- ^{xi} Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 849.
- ^{xii} *Ibid.*, 849.
- ^{xiii} *Ibid.*, 851.
- ^{xiv} *Ibid.*, 851.
- ^{xv} *Ibid.*, 850.
- ^{xvi} *Ibid.*, 850.
- ^{xvii} *Ibid.*, 851.
- ^{xviii} *Ibid.*, 851.
- ^{xix} *Ibid.*, 867.
- ^{xx} *Ibid.*, 851.
- ^{xxi} *Ibid.*, 852.
- ^{xxii} *Ibid.*, 853.
- ^{xxiii} *Ibid.*, 852.
- ^{xxiv} *Ibid.*, 854.
- ^{xxv} *Ibid.*, 853.
- ^{xxvi} Donald Rumsfeld. "Troops put Rumsfeld in the hot seat" from Wolf Blitzer Reports, CNN. December 8 2004. Posted on www.CNN.com Assessed via <http://www.cnn.com/2004/US/12/08/rumsfeld.kuwait/index.html>
- ^{xxvii} *Ibid.*, 31.
- ^{xxviii} *Ibid.*, 32.
- ^{xxix} Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 855.
- ^{xxx} *Ibid.*, 854.
- ^{xxxi} *Ibid.*, 855.
- ^{xxxii} *Ibid.*, 855.
- ^{xxxiii} *Ibid.*, 855.
- ^{xxxiv} The Coalition Scud-Hunting in Iraq, (1991), 32.
- ^{xxxv} *Ibid.*, 32.
- ^{xxxvi} *Ibid.*, 32.
- ^{xxxvii} *Ibid.*, 32.
- ^{xxxviii} Clausewitz. *On War*.
- ^{xxxix} Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 856.
- ^{xl} Thomas Hunter. "Scud Hunting with Delta Forces and the Special Air Service (1991)" *Shadow Spear*. Assessed via <http://www.shadowsppear.com/2009/06/delta-force-special-air-service-hunt-iraq-skuds/> (p. 2)
- ^{xli} Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 856.
- ^{xlii} Merrick E. Krause. "From Theater Missile Defense to Anti-Missile Offensive Actions: A Near-Term Strategic Approach for the USAF". *School of Advanced Airpower Studies Air University Maxwell Air Force Base, AL*. (June 1998) 31-32.

-
- xliii Ibid, 24.
- xliv Ibid, 34.
- xlvi Ibid, 34.
- xlvi Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 851-854.
- xlvi The Coalition Scud-Hunting in Iraq, (1991), 34.
- xlvi Ibid, 29.
- xlvi Merrick E. Krause. "From Theater Missile Defense to Anti-Missile Offensive Actions: A Near-Term Strategic Approach for the USAF". School of Advanced Airpower Studies Air University Maxwell Air Force Base, AL. (June 1998) 34.
- ¹ Ibid., 34.
- li Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 856-857.
- lii Ibid., 857.
- lii R. W. Apple Jr. "War in the Gulf: Scud Attack Scud Missile Hits a U.S. Barracks, Killing 27" *The New York Times*, Published on February 26, 1991. Accessed on 1 January 1, 2017 via <http://www.nytimes.com/1991/02/26/world/war-in-the-gulf-Scud-attack-Scud-missile-hits-a-us-barracks-killing-27.html>
- liv The Coalition Scud-Hunting in Iraq, (1991), 33.
- lv Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 861.
- lvi Ibid., 861.
- lvii Ibid., 861.
- lviii Ibid., 861.
- lix Ibid., 857.
- lx Ibid., 857.
- lxi Ibid., 857.
- lxii Ibid., 859.
- lxiii Ibid., 861.
- lxiv Ibid., 863.
- lxv Ibid., 863.
- lxvi Ibid., 861.
- lxvii Ibid., 861.
- lxviii Ibid., 861.
- lxix Merrick E. Krause. "From Theater Missile Defense to Anti-Missile Offensive Actions: A Near-Term Strategic Approach for the USAF". School of Advanced Airpower Studies Air University Maxwell Air Force Base, AL. (June 1998) 26.
- lxx Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 864.
- lxxi Ibid., 864.
- lxxii The Coalition Scud-Hunting in Iraq, (1991), 31.
- lxxiii Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 861.
- lxxiv Ibid., 861.
- lxxv The Coalition Scud-Hunting in Iraq, (1991), 34.
- lxxvi Ibid., 34.
- lxxvii Video.
- lxxviii The Coalition Scud-Hunting in Iraq, (1991), 35.
- lxxix Ibid., 35.
- lxxx Ibid., 35.
- lxxxi Ibid., 37.
- lxxxii Ibid., 38.
- lxxxiii Ibid., 38.
- lxxxiv Ibid., 39.
- lxxxv Ibid., 38.
- lxxxvi Ibid., 40.

-
- lxxxvii Ibid., 40.
- lxxxviii Ibid., 39.
- lxxxix Ibid., 39.
- xc Ibid., 39.
- xcI Ibid., 39.
- xcii Ibid., 43.
- xciii Ibid., 40.
- xciv Anthony H. Cordesman and Abraham R. Wagner. *The Lessons of Modern War Volume IV: The Gulf War*. Westview Press (a division of Harper Collins Publishers), Boulder, Colorado (1996), 858.
- xcv Ibid., 858.
- xcvi C-SPAN Production. *Congressional Hearing of Gulf War Review. Testimony of Former Chief of Developmental Plans and Analysis, U.S. Air Force, Col. (Ret.) John Boyd*. Sept 30, 1991.
- xcvii Ibid.
- xcviii Ibid.
- xcix Jeffrey W. Meiser. "Are Our Strategic Models Flawed? End + Ways + Means = (Bad) Strategy" *The U.S. Army War College Quarterly Parameters*. Vol. 46, No. 4 (Winter 2016-2017), p81-87.
- c Ibid., 86.
- ci Clayton M. Christen and Michael E. Raynor
- cii Peter Grier. "The First Offset Strategy." *Air Force Magazine* (June 2016), 57. Assessed via <http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/2016/June%202016/0616offset.pdf>
- ciii United Nations Office for Disarmament Affairs (UNODA). *Non-Proliferation of Nuclear Weapons (NPT)*. *un.org*. Assessed via <https://www.un.org/disarmament/wmd/nuclear/npt/>
- civ David Albright. "North Korean Plutonium and Weapon-Grade Uranium Inventories" (PDF)., Institute for Science and International Security, ISIS. Jan 8, 2015 (revised October 7, 2015). Assessed via http://isis-online.org/uploads/isis-reports/documents/North_Korean_Fissile_Material_Stocks_Jan_30_2015_revised_Oct_5_2015-Final.pdf
- cv Jeffrey W. Meiser. "Are Our Strategic Models Flawed? End + Ways + Means = (Bad) Strategy" *The U.S. Army War College Quarterly Parameters*. Vol. 46, No. 4 (Winter 2016-2017), p81-87.
- cvi Scott A. Snyder. (Director of the Program on U.S.-Korea Policy). "U.S. Policy Toward North Korea." Jan 2013, *SERI Quarterly*. Council on Foreign Relations (cfr.org). Assessed via <http://www.cfr.org/north-korea/us-policy-toward-north-korea/p29962>
- cvii Ibid.
- cviii Ibid.
- cix David E. Sanger. "Rex Tillerson Rejects Talks With North Korea on Nuclear Program" *The New York Times* (March 17, 2017). Assessed via https://www.nytimes.com/2017/03/17/world/asia/rex-tillerson-north-korea-nuclear.html?_r=0
- cx "North Korea Readies for War? Kim Jong-un orders evacuation of Pyongyang" *Pravda.ru* Assessed via http://www.pravdareport.com/hotspots/conflicts/12-04-2017/137480-pyongyang_evacuation-0/
- cxI Brian Tyler Cohen. (North Korea Press) "North Korea Just Responded to Trump's Aggression With A Chilling Threat." Published 10 April 2017. *Politics Ed*. Assessed via www.occupydemocrats.com
- cxii Ibid.
- cxiii Jeffrey W. Meiser. "Are Our Strategic Models Flawed? End + Ways + Means = (Bad) Strategy" *The U.S. Army War College Quarterly Parameters*. Vol. 46, No. 4 (Winter 2016-2017), p81-87.
- cxiv Shane Smith. *North Korea's Evolving Nuclear Strategy*. North Korea Nuclear Futures Series, US-Korea Institute at SAIS. (August 2015) p.9
- cxv Ibid., 9.
- cxvi Ibid., 9.
- cxvii BBC Reports. "Mattis warns North Korea of 'overwhelming' response to nuclear use." *BBC News (Asia) Online*. 3 February 2017. Assessed via <http://www.bbc.com/news/world-asia-38850995>
- cxviii Michele A. Flournoy and Robert P. Lyons III, "Sustaining and Enhancing the US Military's Technology Edge." *Strategic Studies Quarterly*; Summer 2016. 3
- cxix Stanley A. McChrystal et. al., *Team of Teams: New Rules of Engagement for a Complex World*. (New York, New York: Portfolio/Penguin, 2015), 164.
- cxx Michele A. Flournoy and Robert P. Lyons III, "Sustaining and Enhancing the US Military's Technology Edge." *Strategic Studies Quarterly*; Summer 2016. 4

^{cxxi} Ibid., 4.

^{cxxii} OSD Comptroller, Defense Budget Overview, 49.

^{cxxiii} Stephen Welby, (Assistant Secretary of Defense for Research and Engineering). “*Accelerating the Development of Military Capability through Innovative Defense Research and Development, Testimony before the Subcommittee on Emerging Threats and Capabilities.*” The House of Representatives, Armed Service Committee. 114th Cong., 2nd sess., (24 February 2016) Assessed via <http://docs.house.gov/meetings/AS/AS26/>

^{cxxiv} Secretary of Defense Ash Carter. (speech; to 607 Air Operation Center Team, 2015).

^{cxxv} Comptroller, Defense Budget Overview: Department of Defense Fiscal Year 2017 Budget Request (Washington, DC: Department of Defense, 2016), 5-6.

^{cxxvi} Zachary Cohen, “Trump Proposes \$54 Billion Defense Spending Hike.” CNN Politics, March 16, 2017.

Assessed via <http://www.cnn.com/2017/03/16/politics/donald-trump-defense-budget-blueprint/>

^{cxxvii} Air Power Australia. “PLA Ballistic Missiles: Tech Report” (2009) Assessed via

<http://www.airspacepower.net/APA-PLA-Ballistic-Missiles.html>

^{cxxviii} Alex Lockie, “China Reportedly Sent 150,000 Troops to North Korea’s Border – Here’s How They Could Stop North Korea.” (April 12, 2017) Assessed via <http://www.businessinsider.com/china-150000-troops-north-korea-xi-trump-2017-4?r=UK&IR=T>

^{cxxix} Ibid.

^{cxxx} Robert Beckhusen, “China’s Missile Swarms vs. America’s Lasers, Drones and Railguns: Who Wins?” Asia Times News & Features (May 23, 2016). Assessed via <http://www.atimes.com/2016Chinas-Missile-Swarm-vs-america-lasers-drones-and-railguns-who-wins>

^{cxxxi} Ibid.

^{cxxxii} US Air Force Core Mission-2035, Multi-Domain Command and Control. (Department of Defense, Washington D.C.). 14-26.