FIREBIRDS: A SIMULATION TO DEMONSTRATE FUNDAMENTALS OF
ARMY AVIATION RECONNAISSANCE AND SECURITY MISSIONS

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE
Wargame Design

by

MATTHEW LITVINAS, MAJOR, UNITED STATES ARMY
B.S, Mount Saint Mary's University, Emmitsburg, MD, 2008

Fort Leavenworth, Kansas
2019

REPORT DOCUMENTATION PAGE

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 this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this 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)* 14-06-2019	2. REPORT TYPE Master's Thesis	3. DATES COVERED *(From - To)* AUG 2018 – JUN 2019

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Firebirds: A Simulation to Demonstrate Fundamentals of Army Aviation Reconnaissance and Security Missions	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)	5d. PROJECT NUMBER
Matthew C. Litvinas Major, FA57 (AV) U.S. Army	5e. TASK NUMBER
	5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD Fort Leavenworth, KS 66027-2301	8. PERFORMING ORG REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution is Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

This competitive wargame will examine the fundamentals necessary for a planner to provide critical information to the commander and demonstrate the complexity of gaining understanding of an unknown environment. This wargame will focus on tactics relevant for army aviation reconnaissance and security missions. The use of this simulation will allow the user to develop a strategy to conduct reconnaissance on specific intelligence requirements and follow the chain to decision points made by the commander. Through the use of this wargame, aviation officers assigned to an aviation reconnaissance squadron may gain greater appreciation of tactics in ATP 3-04.1

15. SUBJECT TERMS
Army Aviation, Reconnaissance, Security, Specific Intelligence Requirement, Priority Intelligence Requirement, Indicators, Attack Reconnaissance Squadron, Training Solutions

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE	(U)	73	19b. PHONE NUMBER *(include area code)*
(U)	(U)	(U)			

MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

Name of Candidate: Matthew C. Litvinas

Thesis Title: Firebirds: A Simulation to Demonstrate Fundamentals of Army Aviation
Reconnaissance and Security Missions

Approved by:

_____, Thesis Committee Chair
Michael B. Dunn, MBA

_____, Member
Lieutenant Colonel Nicholas K. Dall, MMAS

_____, Member
Prisco R. Hernandez, Ph.D.

Accepted this 14th day of June 2019 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, Ph.D.

ABSTRACT

FIREBIRDS: A SIMULATION TO DEMONSTRATE FUNDAMENTALS OF ARMY
AVIATION RECONNAISSANCE AND SECURITY MISSIONS, by Matthew C.
Litvinas, 73 pages.

This competitive wargame will examine the fundamentals necessary for a planner to
provide critical information to the commander and demonstrate the complexity of gaining
understanding of an unknown environment. This wargame will focus on tactics relevant
for army aviation reconnaissance and security missions. The use of this simulation will
allow the user to develop a strategy to conduct reconnaissance on specific intelligence
requirements and follow the chain to decision points made by the commander. Through
the use of this wargame, aviation officers assigned to an aviation reconnaissance
squadron may gain greater appreciation of tactics in ATP 3-04.1

ACKNOWLEDGMENTS

TABLE OF CONTENTS

ILLUSTRATIONS

Page

CHAPTER 1

INTRODUCTION

Background

Since the terrorist attacks on 9/11, the United States conducted Combat

Operations in Iraq and in Afghanistan. After the immediate success of the kinetic

offensive engagements, the United States, NATO, and the Coalition of the Willing

conducted counter insurgency operations. Starting in 2013, the Army conducted the

Aviation Restructure Initiative (ARI). This initiative was to ensure that Army Aviation

remained capable of fighting and winning our nation's wars while reducing costs.[1] This

removed the reconnaissance platform, the OH-58D Kiowa Warrior, from the Army

inventory and replaced it with AH-64D Apache attack helicopter, and the RQ-7B Shadow

Unmanned Aircraft System (UAS). This concept is known as Manned-Unmanned

Teaming (MUM-T). MUM-T partners an UAS, such as a Gray Eagle or Shadow, as a

forward reconnaissance element to provide increased situational awareness for a manned

attack platform, such as an Apache.[2] ARI was executed to both provide the ground force

with a more modern platform and also to stream logistical requirements. The efficiency

was gained by replacing the OH-58D with existing AH-64's from the National Guard and

---

[1] Kelly P. Pate, "Aviation Restructure Initiative: Balancing Act Seeks to Get Force Right," U.S. Army, August 2014, accessed November 1, 2018, https://www.army.mil/article/131869/aviation_restructure_initiative_balancing_act_seeks _to_get_force_right.

[2] Headquarters, Department of the Army (HQDA), Army Techniques Publication (ATP) 3-04.1, *Aviation Tactical Employment* (Washington, DC: Department of the Army, April 2016), G-1.

RQ-7B restructured from other active duty units. This allowed for the unique requirements of the OH-58D to be eliminated, such as a separate school house for personnel maintainers and pilots; and all equipment.[3]

Army Aviation identified a short term and long-term knowledge gap due to the removal of the OH-58D. The removal of the OH-58D platform resulted in the voluntary and involuntary separation of the subject matter experts on Air Cavalry Operations from the Army. In addition, the new AH-64 pilots had the potential to go between training for attack missions with the Attack Reconnaissance Battalion, and the Reconnaissance and Security fight with the Attack Reconnaissance Squadron. This change in organization structure similarly affected the skill set of the Shadow UAS operator. The Shadow UAS operators are now utilized in both the Brigade Engineer Battalion and the Attack Reconnaissance Squadron.[4]

To ensure quality of leaders inside the Attack Reconnaissance Squadron, the Army Created the Air Cavalry Leaders course. This course is designed for post career course Commissioned Officers, 15W Unmanned Aircraft Operators, and senior Warrant Officers such as an Instructor Pilots.[5] There still remains a training deficit for junior Officers and Warrant Officers inside the Attack Reconnaissance Squadron. The purpose

---

[3] Pate, "Aviation Restructure Initiative."

[4] Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-04, *Army Aviation* (Washington, DC: Department of the Army, July 2015), 2-6 - 2-7.

[5] Kelly P. Morris, "Air Cavalry Leaders Course Shapes Air Ground Reconnaissance," U.S. Army, December 2015, accessed October 2, 2018, https://www.army.mil/article/159622/air_cavalry_leaders_course_shapes_air_ground_rec onnaissance.

of this study is to see if a competitive wargame can help alleviate the knowledge gap in the planning and conducting air cavalry operations for personnel who are unable to attend the Air Cavalry Leader's course.

Research Question

The proposed research question is whether Air Cavalry Planning techniques can be modeled in a competitive game that can be adapted to assist in training Aviation Officers on planning Reconnaissance and Security missions?

Supporting questions used: which Reconnaissance and Security operation decisions are critical to emulate in a competitive wargame? Which aviation support functions are critical for decision making in a competitive wargame? How do you provide proper level of fog of war and intelligence preparation of the battlefield?

Assumptions

For the work of this thesis many relevant assumptions will be used. First is the assumption that the best way to train is to conduct full scale force on force wargames. In the absence of the ability to conduct this, all training is scaled to the objectives being trained. The core principal for this effort will be *ATP 3-04.1 Army Aviation*.[6] Inside this doctrine are the fundamentals, planning considerations, and forms of Reconnaissance and Security Operations. The enemy situation template will be designed based on Army

---

[6] HQDA, ATP 3-04.1.

training doctrine,[7] *Training Circular 7-100,*[8] and *The Russian Way of War* by Dr. Grau and Mr. Bartles.[9]

The practice of using wargames and simulations has been proven successful in training and refining decision-making skills. One of the foundations for current United States Army doctrine was the Prussian wargame *Kriegsspiel*.[10] This game refined relationships in the Prussian War College and helped create generations of tacticians. With the proven success of the Air Cavalry Leader's Course, the techniques and standards can be modeled in a contained environment. This provides the foundation of this endeavor.

<div align="center">Limitation</div>

The research that is conducted here will be limited in nature. The classification of this project will remain at Unclassified, public releasable. This will result in generic enemy situations. In addition, this research will utilize generic equipment technical specifications from non-government sources. There would be increased applicability through refinement of the model utilizing classified equipment technical capabilities

---

[7] U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-3-6, *The U.S. Army Functional Concept for Movement and Maneuver 2020-2040* (Fort Eustis, VA: Training and Doctrine Command, February 2017).

[8] Headquarters, Department of the Army (HQDA), Training Circular (TC) 7-100, *Hybrid Threat* (Washington, DC: Department of the Army. November 2010).

[9] Lester W. Grau and Charles K. Bartles, *The Russian Way of War* (Fort Leavenworth, KS. Foreign Military Studies Office, 2016).

[10] *Kriegspiel. 1824,* B von Reisswitz, trans. Bill Leeson (Board game, Netherwood Dalton, 1983).

Scope and Delimitations

The scope of this project will be to assess the feasibility and suitability of utilizing a competitive game to teach aviation planning concepts for reconnaissance and security fights. This study will not focus on the specific technical specifications of munitions, systems, and vehicles. Focus on technical aspects such as cockpit procedural training or target acquisitions techniques are not translated effectively in tactical board game. Technical tasks are better trained in an aircraft simulator or live flight. Any additional rules, tables, or charts to run technical tasks will result in a burdensome game that will not meet intent to support the target audience.

Significance of the Study

This study builds on key mechanisms and processes to build future aviation training wargames. This study further provides an exportable package to provide hands on learning. The Army's education model is the Army Learning Concept.[11] This model has proven successful in retention of information and application for future use. Successful creation of competitive games on this subject could provide for higher training value at FORSCOM units and also be integrated into TRADOC programs of instruction.[12]

---

[11] U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-8-2, *The U.S. Learning Concept for Training and Education 2020-2040* (Fort Eustis, VA: TRADOC, April 2017), 7.

[12] Ibid., 10.

Summary and Conclusions

Firebirds' focus is to assist in the development of the next generation of Aeroscouts. ARI resulted in aviators required to be masters of two very complex problem sets; both, the Attack mission and the Cavalry mission. *Firebirds* will look at assisting the growth at junior levels to help understand the importance of complex planning factors for the former. This is not a substitution for technical trainers. Chapter 2 will discuss the research on the topic. Research will focus on three areas, Doctrine, Games, and Fundamentals of Game Design. Chapter 3 will define the decisions the player needs to make in the Reconnaissance and Security fight. Sid Meier states "games are a series of interesting decisions." These decisions are the foundation of any wargame and should be built to support the training tasks. Chapter 4 will examine how those interesting decisions were modeled and the rules that support those events. Chapter 5 will provide conclusions and follow on recommendations for further research.

CHAPTER 2

LITERATURE REVIEW

Introduction

Reconnaissance and Security missions require detailed planning to provide a continuous flow of information to enable a commander's decision making.[13] This study will look to show that a competitive wargame can instill the fundamentals necessary for a planner to develop that detailed plan to answer the commander's information requirements. There are three categories of literature that this study will build on. First is Army Doctrine. Army doctrine is the keystone of this study. Every decision the players make must originate from Army Doctrine. The second category of literature is literature on wargame design. The third is competitive game reviews. There are countless wargames that have approached similar topics. A review of how experienced designers-built gaming mechanisms to replicate problems will help push this study further.

Current Army Publications

In designing *Firebirds*, Army Doctrine is the foundation of the product. The effort in the design is wasted if the endstate cannot provide value to training Aviation Officers. The decisions the player must make will be derived from those foundations taught in Army Doctrine.

---

[13] Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-98, *Reconnaissance and Security Operations* (Washington, DC: Department of the Army, July 2015), 1-1.

FM 3-04 Army Aviation.[14] provides the foundations for this endeavor. *Firebirds* defines the core competency of security missions to be to "Provide Reaction Time and Maneuver Space."[15] Chapter 3, sections IV and V of *FM 3-04* defines reconnaissance and security missions. These sections provide the parameters for the model to be utilized in *Firebirds*. *FM 3-04* defines security operations as:

> those operations undertaken by the commander to provide early and accurate warning of enemy operations to provide the force being protected with time and maneuver space to react to the enemy, and to develop the situation to allow the commander to effectively employ the protected force.[16]

In addition, it states the scope and responsibility of the aviation taskforce serving as the headquarters during a screen or guard mission with augmentation.[17] Those responsibilities include tasks such as detecting all enemy prior to passing the screen, locating the lead elements, and maintaining contact with the enemy.[18] This limits the scope of the mission provided to the player. "Due to the size, complexity and mission command requirements, Army Aviation is not assigned the covering force headquarters mission."[19] *FM 3-04* further defines fundamentals associated with a Screen, Guard and Cover. The five fundamentals are "provide early and accurate warning," "provide reaction time and maneuver space," "orient on the protected force, area, or facility,"

---

[14] HQDA, FM 3-04.

[15] Ibid., 1-2.

[16] Ibid., 3-17.

[17] Ibid., 3-22.

[18] Ibid., 3-21.

[19] Ibid., 3-18.

"perform continuous reconnaissance," and maintain enemy contact."[20] These five

fundamentals must be adhered to for any successful security operation. The players

should in turn fail if not choosing to not follow these fundamentals. The structure of the

primary unit will be defined by *FM 3*-04 chapter 1, section IV, the Attack

Reconnaissance Squadron (ARS). The ARS is defined by three companies with eight

AH-64's Apache Attack Helicopters and four RQ-7B Shadow Tactical Unmanned

Aircraft Systems.[21]

   ATP 3-04.1 Aviation Tactical Employment builds on the topics discussed in *FM 3-04*.[22] Appendix C Attack/Reconnaissance example checklists and briefing documents

provides a doctrinal solution for planning and the orders process.[23] Annex C includes a

large amount of planning steps requirements ranging from the math battlefield calculus to

requirements for Forward Arming and Refueling Points sketches.[24] *ATP 3-04.17*,

Techniques for Forward Arming and Refueling Points (FARP), provides the logistical

requirements for keeping the ARS in the air.[25] FARP logistical planning will make or

---

[20] HQDA, FM 3-04, 3-23.

[21] Ibid., 2-7.

[22] HQDA, ATP 3-04.1.

[23] Ibid., C-1 - C-20.

[24] Ibid., C-2, C-3.

[25] Headquarters, Department of the Army (HQDA), Army Techniques Publication (ATP) 3-04.17, *Techniques for Forward Arming and Refueling Points* (Washington, DC: Department of the Army, June 2018), 1-1.

break any operation. This ATP provides planning considerations for the variety and

capacity of FARPs available to the ARS. [26]

<u>Game Design</u>

With our foundation set in doctrine, the next influence is theories of game design

and the art of wargaming. The three books that influence *Firebirds* are Peter Perla's *The*

Art of Wargaming, Philip Sabin's *Simulating War,* and Raph Koster *a Theory of Fun.*[27]

Wargames provide educational utility. Sabin said:

> The most important function of wargames is to convey a vicarious understanding
> of some of the strategic and tactical dynamics associated with real military
> operations. Besides learning about the force, space and time relationships in the
> specific battle or campaign being simulated, players soon acquire an intuitive feel
> for more generic interactive dynamics associated with warfare as a whole. [28]

To train for large scale combat operations abstraction will occur. However, as Sabin is

effective in describing, the understanding achieved through the execution of a well-

designed wargame allows for increased knowledge on the topic. Getting in the repetitions

of making decision by reacting to a live and thinking opponent makes the players more

effective at decision making. Similarly, Perla states "Wargames revolve around the

interplay of human decisions and game events; this active and central involvement of

human beings is the characteristic that distinguishes wargames from other types of

---

[26] HQDA, ATP 3-04.17, 2-1 - 2-5.

[27] Philip Sabin, *Simulating War: Studying Conflict through Simulation Games,*
2nd. ed. (New York: Bloomsbury Academics, 2014); Peter Perla, *Peter Perla's The Art
of Wargaming* (Annapolis, MD: The United States Naval Institute, 2011); Ralph Koster,
A Theory of Fun for Game Design, 2nd ed. (Sebastopol, CA: O'Reilly Media, 2014).

[28] Sabin, *Simulating War,* 31.

models and simulations."[29] The intended audience for *Firebirds* is centered around new aviators trying to improve their planning and decision making. An intuitive wargame would be an effective way to prepare them for the peril of Large-Scale Combat Operations.

Sabin describes the four main areas to develop a model to be an effective representation of a scenario. They are: 1) understanding of the geographic environment, 2) understanding of the orders of battle, 3) equipment capabilities and logistical requirements, and, 4) the decision environment facing commanders.[30] The model supporting *Firebirds* must utilizes these tenants. The focus of this model is rooted in doctrine as mentioned in the above. The operational environment should represent the capabilities and limitations of the Attack Reconnaissance Squadron executing its assigned mission again a realistic peer enemy.

<u>Relevant Games</u>

Many wargames provide relevant perspectives to aspects of *Firebirds*. Games reviewed varied from helicopter-based flight games that focus on the pilot, to commander focused games. In the development of *Firebirds*, these games provided good examples of what needed to be achieved and cautionary examples on what would prevent use for the intended audience.

---

[29] Perla, *Peter Perla's The Art of Wargaming,* 23.

[30] Sabin, *Simulating War,* 47-48.

Air Cav, by Tony Merridt, provides a great game in showing the complexity and ability an attack helicopter brings to the battlefield.[31] The designer's purpose was to illustrate how "helicopters are integral parts of the modern battle field."[32] This game demonstrates the great complexity in the employment of attack helicopters to those outside of Army Aviation. The focus of this game is to represent the individual pilot. The massive rule book allows for the player to fly any type of flight profile, conduct differing types engagements, and utilize multiple munitions. However, for the designated military audience, an aircraft simulator will provide better understanding of the engagement ranges of a hellfire than a boardgame. What it does provide for the designated audience is concepts on movement and integration with other units. *Air Cav* provides a concept of fires integration and combined arms maneuver. However, the use of these functions also requires constant reading of rules and charts.

On the opposite spectrum for play interface is *Kriegspiel.*[33] *Kriegspiel* is the original wargame that set forth the Army's Operations Orders process. This game's design, utilizing separate maps and requiring personnel to act as runners, provides the player a true experience of fog of war. The player in this game uses written orders as an intuitive interface. The price to pay for the realism in fog of war is the high overhead of umpires refereeing the game. This overhead also incurs additional setup time and requires training on conducting the game effectively. However, elegant aspects of player

---

[31] *Air Cav,* Tony Merridt (Board game, Westend games, 1985).

[32] Ibid., 14.

[33] *Kriegspiel. 1824.*

interaction enable teaching points that would not be able to be achieved without an open scenario.

Air and Armour, designed by Bruce Maxwell, simulates a large-scale battle between the Warsaw Pact and NATO.[34] This game tries to provide fog of war by utilizing "bluff" pieces. This, however, does not provide for the ability to hide a main body. Fires integration were dominant in the game play. Their ability to target units outside of reconnaissance negated the fog of war provided by bluffing.

In the game *1805, Sea of Glory*, the fog of war mechanism was developed very elegantly.[35] The game focuses on naval combat and blockades of ports. If a ship departed a port undetected, an additional piece was added to the board. The player was free to move this piece as deemed necessary to deceive the opposing player of the true intentions of his mission. This mechanism lends itself well to modeling the fundamentals of reconnaissance and security by forcing the player to maintain continuous reconnaissance at the ports. Failure to do this resulted in the opponent covering the Atlantic in fog of war pieces, making it extremely difficult to regain contact.

Dean Essig and Al Sandrick's, *Yom Kippur* provides a recreation of the surprise attack across the Suez Canal.[36] This game provided a unique example of force alignment. To recreate the surprise attack, the Israeli player places his forces down first in designated areas. Then, with the board present, the Egyptians player plans his attack. For

---

[34] *Air and Armor,* Bruce Maxwell (West End Games, 1986).

[35] *1805: Sea of Glory,* Phil Fry (GMT Games, 2009).

[36] *Yom Kippur,* Dean Essig and Al Sandrick (The Gamers, 1995).

the first turn the Israelis, while playing, are not able to achieve much of a counter attack. They do not have the forces and the rules are not in their favor. When the second turn hits, they are able to place a sizeable army down and that's when the game for both sides really begins.

Space Invaders, is a classic arcade game that first was released in 1978.[37] Space invaders is game that has a horde of alien invaders starting at the top of the screen and then they follow a predetermined path down to the hero defending earth. This hero blasts away at the alien forces until he finally gets overwhelmed. While *Space Invaders* provides a good example of proper orientation of the force to be protected while conducting security operations, the model does not address the complexity of a thinking enemy who may vary in course of action.

<u>Conclusion</u>

To conduct Reconnaissance and Security missions requires detailed planning. Wargame simulations provide the ability for increased repetitions to improve cognitive functions and improve decision making. A model based on doctrine to focus on Attack Reconnaissance Squadron support to Division operations against a peer threat provides the foundation for training planners for large scale combat operations. Utilizing mechanics proven in games such as *1805 and Kreigspiel* will provide and intuitive model

---

[37] *Space Invaders,* Tomohiro Nishikado (Taito Corporation, Midway Games, 1978).

that will emphasize gaining contact and developing the situation.[38] This will simulate to

providing a continuous flow of information feed commander's decision making.[39]

---

[38] *Kriegspiel. 1824; 1805: Sea of Glory.*

[39] HQDA, FM 3-98, 1-1.

CHAPTER 3

IMPORTANT ASPECTS OF THE WARGAME

Six overarching concepts became relevant during the conceptualization of how to train and reinforce proper reconnaissance and security fundamentals. They are 1) the integration of reconnaissance and security operations; 2) the employment of aviation as part of a combined arms team; 3) the integration of fire support planning and coordination; 4) the determination of opposing forces organization, equipment, and threat tactics; 5) the analysis of terrain and how to conduct a map reconnaissance; and 6) the planning of cavalry operations. The integration of reconnaissance and security operations is the theory that serves as the foundation of this subject. In contrast, the planning of cavalry operations is the practical application of the theory within the constraints of the aviation operations that operate in support of large-scale combat operations. The four other attributes are critical tasks that help refine the depth of knowledge and link theory to practical application. Analyzing the fundamentals in these tasks will provide the foundation to the development of *Firebirds*.

Integration Reconnaissance and Security Operations

At the basis of *Firebirds* is the proper utilization of Army aviation to provide the ground force commander reaction time and maneuver space. This is done through two mission types, reconnaissance and security. These two missions are similar in nature and provide complimentary support to the main body's mission. Reconnaissance and security are not the decisive operation. They are supporting efforts that facilitate answering information requirements for a larger force in the offense or defense. The theory that

encompasses all other subtasks is the integration of reconnaissance and security operations into the scheme of maneuver.[40]

The Army defines reconnaissance as "A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic or geographic characteristics of a particular area."[41] Army aviation, primarily UAS and attack helicopters, are assigned deliberate reconnaissance missions. These reconnaissance missions "support the commander's situational awareness and decision-making processes by providing accurate and timely information about the enemy and the area of operations."[42] The primary purpose of reconnaissance is to answer the Commander's Critical Information Requirements. These CCIRs are gaps in the Commander's understanding of the operational environment. CCIRs correspond to decision points for the Commander, such as when to commit the reserve or to change priorities of fire. CCIRs are split between friendly information and enemy information. Reconnaissance and security operations focus on enemy and terrain information requirements. These information requirements are Priority Information Requirements (PIR). An example of a PIR are:

Is the enemy utilizing avenue approach 2 or avenue approach 3?

---

[40] Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-0, *Operations* (Washington, DC: Department of the Army, October 2017), 5-9 - 5-13.

[41] Headquarters, Department of the Army (HQDA), Army Doctrine Publication (ADP) 1-02, *Terms and Military Symbols* (Washington, DC: Department of the Army, September 2014), 1-80.

[42] HQDA, ATP 3-04.1, 3-1.

Is the enemy conducting the templated Most Dangerous Course of Action by committing a brigade size element to the attack?

Rarely will the reconnaissance objective present itself so clearly, in which a PIR can be answered directly. Planners and intelligence officers break down PIR's into indicators and then match these indicators to specific information requirements (SIR). An SIR is some type of signature that can be used to confirm or deny an indicator. An example of an SIR could be a signal intelligence collection that identifies a unique radio wave form associated with a specific piece of equipment. By identifying this piece of equipment and thereby understanding the enemy organizational template, the planners and intelligence officers have an indicator. The Commander can have an answer to a PIR and understand the enemy formation he is facing. The more likely SIR for Army Aviation inside the Combat Aviation Brigade would be to identify a formation larger than a company. This would indicate a battalion formation even though not all of the battalion is identified. ATP 3-04.1 illustrates this in the figure below.
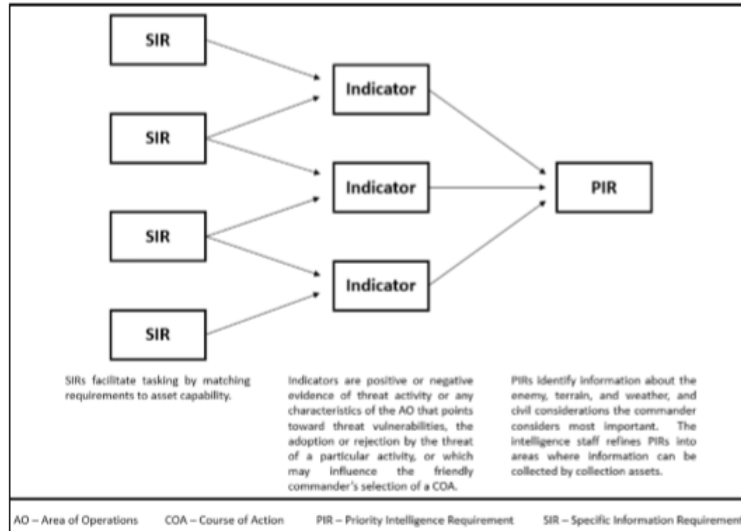
Figure 1.   Relationship between Intelligence Requirements and Indicators

Source: Headquarters, Department of the Army, Army Techniques Publication 3-04.1, *Aviation Tactical Employment* (Washington, DC: Department of the Army, April 2016), figure 3-1.

The Army defines security operations as "those operations undertaken by a commander to provide early and accurate warning of enemy operations, to provide the force being protected with time and maneuver space within which to react to the enemy, and to develop the situation to allow the commander to effectively use the protected force."[43] Reconnaissance and security operations at their simplest form are very similar, with one major exception. Both are used to help Commander understand the operating environment, provide reaction time and maneuver space, and answer CCIRs that will lead to decision points. The fundamental difference between the two operations is orientation of the operation. Reconnaissance operations orient on the reconnaissance objective. As

---

[43] HQDA, ADP 1-02, 1-86.

mentioned above, these are the SIRs that lead to indicators to identify the PIRs.[44]

Security Operations orient on the protected force, area, or facility.[45] During the planning

of Security Operations, commander's provide guidance on focus, tempo, engagement

criteria, and displacement criteria.[46] Utilizing this planning guidance, planners determine

the distance between the security element and the main body. This distance has to be far

enough to provide the commander reaction time to make decisions but close enough to

support logistically and maintain control. The determination of engagement criteria is an

essential task for the security operation. Engagement criteria determines how the security

element preserves combat power.[47] The security element is always required to ensure all

enemies are detected prior to passing the security line. By developing an understanding of

the fundamentals of both Reconnaissance and Security Operations, the Aviation officer is

able to integrate Army Aviation into the scheme of maneuver.

 To nest these efforts, planners develop the Scheme of Intelligence. The Scheme of

Intelligence determines the priority of effort for developing the situation.[48] This is done

through synchronizing units to Named Areas of Interest (NAIs), SIRs, and providing time

information is required to still be of value. This time is referred to as Latest Time

---

[44] HQDA, ATP 3-04.1, 3-4.

[45] Ibid., 4-2.

[46] Ibid., 4-3.

[47] Ibid.

[48] Headquarters, Department of the Army (HQDA), Field Manual (FM) 6-0, *Commander and Staff Organization and Operations* (Washington, DC: Department of the Army, May 2014), C-14.

Information of Value (LTIOV). Synchronizing units achieves the initial reconnaissance and security plan associated with WARNO 2 during the Military Decision-Making Process and allows the scouts to conduct operations.[49]

<u>Employment of Aviation as Part of a Combined Arms Team</u>

The Army defines combined arms as "the synchronized and simultaneous application of arms to achieve an effect greater than if each arm was used separately or sequentially."[50] The Army further defines a combined arms team as a mutual supporting mixture of two or more branches such as Infantry and Armor or Armor, Field Artillery and Aviation.[51] The proper utilization of these units provides a synergistic effect, presenting the enemy commander with multiple dilemmas to combat simultaneously. Army Aviation contributes to the overall combined arms operations through reconnaissance and security operations. ATP 3-04.1 states these aviation operations are part of a "combined arms effort that enables the commander to make decisions to seize, retain and exploit the initiative. Reconnaissance is a component of troop leading procedures for every mission and it supports the entire range of unified land operation."[52] To understand how to employ Army Aviation in reconnaissance and security operations, the aviation officer must understand how to enable the ground force through its integration into a combined arms team.

---

[49] HQDA, FM 6-0, 9-3.

[50] HQDA, ADP 1-02, 1-19.

[51] Ibid.

[52] HQDA, ATP 3-04.1, 3-1.

Integration of Fire Support Planning and Coordination

As part of the combined arms team, aviation and fires become increasingly important to integrate in future contested multi-domain operations.[53] The integration of fires, in planning and execution, enables the aviation element to reduce risk. As the aviation reconnaissance elements gain contact with the enemy, they may transition to a screen depending on planning factors such as engagement and disengagement criteria.[54] During this transition, the aviation force is able to utilize indirect fires to impede movement of the enemy force. This allows the aviation element to develop the situation further and help identify SIRs.[55] Furthermore, this allows the screening element freedom of maneuver and prevents them from being decisively engaged by the enemy. When planning security and reconnaissance operations, the security force should plan for the operation inside the range of friendly artillery.[56]

Determination of Opposing Forces Organization, Equipment, and Threat Tactics

To answer the SIRs required to support the commander PIRs, the aviation planner needs to understand opposing force and equipment. Opposing forces arrange their units based on their own doctrine, mission and terrain. For example, given terrain that has multiple river crossings, the enemy would be expected to weight its main effort with increased engineer bridging assets. This would indicate bridging assets to be a high-value

---

[53] TRADOC, TRADOC Pamphlet 525-3-6, 11.

[54] HQDA, ATP 3-04.1, 3-8.

[55] Ibid., 3-5.

[56] Ibid., 4-17.

target (HVT). ADP 1-02 defines an HVT as "a target the enemy commander requires for the successful completion of the mission."[57] In contrast, a high pay-off target (HPT) is "a target whose loss to the enemy will significantly contribute to the success of the friendly course of action."[58] For Army aviation, all enemy air defense artillery is an HPT. This is because the elimination of these units from the operating environment provides an immediate asymmetric ability to the Aviation unit. The elimination of this threat provides freedom of maneuver and increased flexibility in flight modes, such as contour instead of Nap-of-the-Earth (NOE).[59]

In addition to the identification of the equipment, equally important is the identification of the tactics being utilized by the enemy. *The Russian Way of War* provides a template of a Russian tactical march, known as "the March." It describes this order of march, in which a reconnaissance platoon leads the formation, followed by the advance party. To provide protection to the headquarters element, an air defense platoon is located in the first third of the formation with the support. Field artillery is in the back.[60] By studying templated tactics such as this one, the reconnaissance planner is able to develop SIR's that lead to indicators. This allows for the confirmation of a battalion by identifying the advance party.

---

[57] HQDA, ADP 1-02, 1-48.

[58] Ibid., 1-47.

[59] Headquarters, Department of the Army (HQDA), Training Circular (TC) 3-04.4, *Fundamentals of Flight* (Washington, DC: Department of the Army, December 2016), 5-3.

[60] Grau and Bartles, *The Russian Way of War*, 148.

Analysis of Terrain and Map Reconnaissance

All military operations require understanding the terrain that the operation is going to be conducted on. Whether the operation is enemy focused or terrain focused, terrain will influence the operation. Prior to conducting any operation, diligence should be into conducting a map reconnaissance. Aviation planners should identify avenues of approach that would support the enemy movement. This identification should incorporate the threat organization and possible enemy courses of action. Key terrain should be identified, such as high terrain and bridges.

In addition to examining ground movement, map reconnaissance is also used when developing flight routes. Routes are determined, first, by utilizing terrain to mask routes against potential acquisition through visibility or radar. In addition, terrain is utilized for developing attack positions to allow for quick release of munitions and returning to the safety of cover. Finally, these positions on the terrain are also examined to ensure the engagement area is within the last one third of the weapons systems range. This allow for maximum standoff from the enemy to provide increased protection and reduce audible and visual signatures. These aspects of a map reconnaissance lead directly into the planning of a cavalry operation.[61]

Planning Cavalry Operations

All of the previous mentioned tasks are required to plan cavalry operations. Aviation planners have to understand the limitations and advantages of their aircraft to

---

[61] HQDA, TC 3-04.4, 5-1 - 5-14.

place them on the battlefield. The figure below summarizes the basics of planning for a security operation.
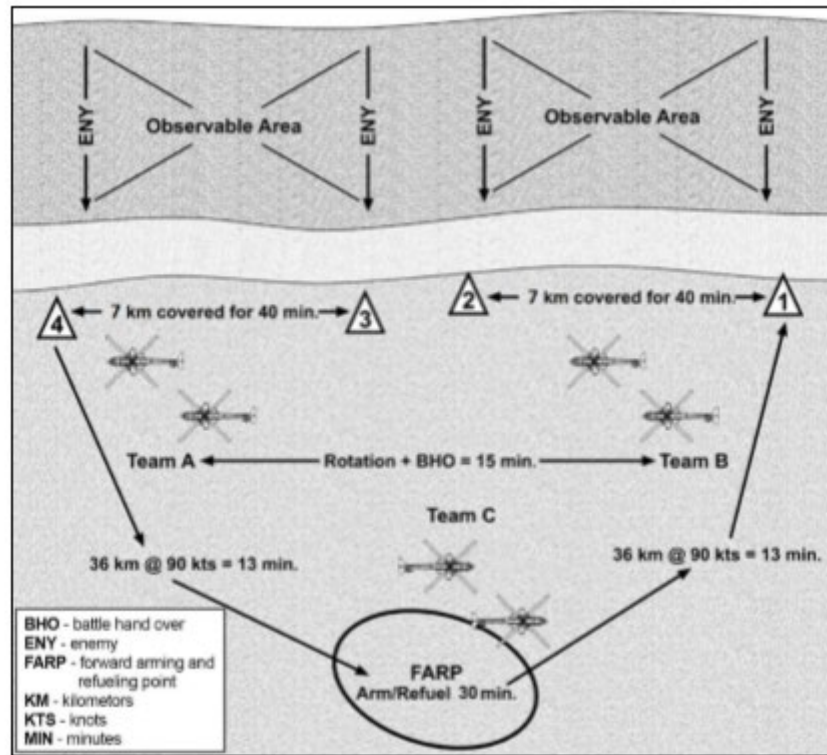

Figure 2.   Example of Scout Weapons Team Screen Rotation Times

Source: Headquarters, Department of the Army, Army Techniques Publication 3-04.1, *Aviation Tactical Employment* (Washington, DC: Department of the Army, April 2016), figure 4-9.

In this figure a company of attack helicopters are conducting a screen. This figure illustrates the planning of a screen operation. First, the planner calculates the size of the screen line and where to place the Observation Posts, as identified as the triangles on the graphics. Ahead of each team, the planner has to calculate the time the enemy unit requires to pass through the observable enemy area. To successfully conduct a screen

33

operation, the aviation unit must be able to identify the assigned enemy unit size in this time. As team B rotates to replace team A, the planner has to account for the time to successfully conduct a battle hand over. In addition, the time, distance, and heading calculations for the teams have to be made to and from the Forward Arming and Fueling point (FARP). the planning factor of 30 mins per refueling operation is also accounted for. FARPs must be preplanned and responsive to mission requirements. They are easily targeted and are vulnerable to both direct and indirect fires. Placement of FARPs are essential to the support of the mission and the safety of the forces. FARPs should 10-20 KM away from the front line of friendly troops, 30-40 KMs away from the objective.[62] After these times are accounted for, the planner then takes into account the fuel performance of the aircraft. The process to jump, or emplace, the FARP also requires tactical mission planning. Ingress and egress routes, security for personnel, and the use of alternate locations are some of the key factors. The major threat to FARP's are indirect fires. FARPs inside enemy field artillery ranges are required to move after every use. Utilizing, at a minimum, the regulatory fuel reserve time, the planner will then adjust time on station to optimize the aircraft flow between FARP and screen and ensure the security fundamental of continuous reconnaissance is adhered to.

<div align="center">Conclusion</div>

The six overarching concepts are all mutually reinforcing concepts to train proper reconnaissance and security fundamentals. The integration of reconnaissance and security operations provides an understanding of the fundamentals of reconnaissance and security

---

[62] HQDA, ATP 3-04.17, 2-3.

operations so that the aviation officer is able to integrate Army Aviation into the scheme of maneuver. Employing aviation as part of a combined arms team, integrating fire support planning and coordination, determining opposing forces organization, equipment and threat tactics, and analyzing terrain provide the tools to execute reconnaissance. All of these tools and theory, allows the aviator to finally understand the how to plan cavalry operations. Analyzing the fundamentals in these tasks will provide the foundation for the development of *Firebirds*.

CHAPTER 4

FIREBIRDS WARGAME

Introduction

Firebirds is a hex boardgame, that utilizes alternating turns and simple combat resolution. The game sets one troop of attack helicopters against one battalion of armor with enablers. *Firebirds* utilizes game mechanisms to enable training in reconnaissance and security. The two main mechanisms are the uncertain victory conditions for the aviation player and "fog of war" units. These two elements force the player be in an unknown, fast-paced environment, where the player is forced to rapidly gain and maintain contact with the enemy. This environment is staged through the scenario's warning order that allows for the players to conceptualize the reconnaissance and security tasks in the division fight. These two key aspects allow for the six concepts to be modeled through the wargame design standard of Space, Assets, Time, and Resolution.

Game Overview

Firebirds gameplay begins with receipt of mission. The scenario product is derived from the information that would be, in reality, provided in the second warning order produced during the military decision-making process, to support the reconnaissance and security fight. The ground player rolls to find out which mission he is to attempt. This allows for the initial set-up of the board. The ground player at this point understands the mission and sets out the array of forces, while the aviation player only sees a horde of pieces. These pieces may be armor, engineer, air defense, or simply a fog of war piece. After the initial set up of the game, the aviation player begins each turn. The

aviation player tries to gain contact, through acquisition of the ground player's forces, to develop the situation. The aviation player is constantly presented with multiple dilemmas. Which course of action is the ground player going to conduct? Which SIRs are present that confirm indicators and allow for confirmation or denial of the PIR? Where is the threat to my aircraft? Where is the threat to the force I am to protect? How much fuel is remaining and how do I jump my FARPs? The ground force has simpler problems to solve, but requires balancing survivability against movement speed, as well as proper task organization to allow for breaching of obstacles and protection, and the use of deception to mask movements. Each turn, the ground force player tries to move to his forces to achieve the end state. His offensive movements control the tempo of the game. Half way through game play, the aviation is presented the opportunity to determine the enemy course of action. This decision point, employs the aviation player's higher headquarters' reserve. This determination, successful or not, will vary the number of required ground force units to achieve victory. The game play utilizes simple acquisition, targeting and movement rules to allow the focus of the game to be on the tasks to be trained instead of statistical accuracy. This chapter will provide explanation to the major design aspects of *Firebirds*.

<div align="center">Integration Reconnaissance and Security Operations</div>

Firebirds design centers on the integration of reconnaissance and security operations. Upon receipt of the order, the aviation player is tasked with gaining contact with the enemy through conducting a zone reconnaissance. The player's second task is to be prepared to conduct a screen. For reconnaissance and security tasks to be trained effectively, the aviation player must have minimal situational awareness and only can be

rewarded with greater situational awareness through developing the situation. To achieve these variable levels of situational awareness, *Firebirds* utilize two key mechanisms. They are the variable victory conditions and the fog of war units.

Victory Conditions

Firebirds utilizes three different victory conditions. These conditions remain unknown to the aviation player until the game is completed. As the ground player appears to indicate his course of action, the aviation player attempts to correctly determine the ground player's course of action. Prior to turn 10, the aviation player can commit the division's reserve to counter the enemy's course of action as the aviation player understands it. If the reserve is committed successfully, the ground force requires an additional company worth of armor to get to the objective to achieve victory. If the reserve is committed to the wrong course of action, the ground force requires less combat power to achieve its result. The aviation player is not required to predict the ground force player's course of action. However, the victory conditions make it difficult to achieve victory for the aviation player without a successful determination.

The three victory conditions are broken down as most dangerous course of action (MDCOA) A: Conduct a spoiling attack on AA A, MDCOA B: Conduct a spoiling attack on AA B, and most likely course of action (MLCOA): Establish a defense in depth. The victory conditions are defined by the ground player's course of action found in the scenario product, WARNO 2 to operation Firebirds, Appendix D.[63] The scenario products then define to the aviation player's mission and provides direction in preventing

---

[63] HQDA, FM 6-0, 9-3.

the ground force player from achieving his victory conditions. The scheme of intelligence becomes the key in the training the integration of reconnaissance and security tasks. The scenario products provide an SIR to indicator to PIR diagram. Through the execution of the game play, the aviation player is able to correlate what indications were observed. From there it allows for the discussion and review of decisions made by the aviation player.

The victory conditions also demonstrate the relevance of last time information of value. In the scenario, turn 10 presents the decision to the aviation player to determine the enemy's COA so as to recommend tasking the reserve. Half way through the game, the victory conditions are adjusted based on the prediction of the aviation player. This is done to show the time and distance calculations of the reserve to disrupt the ground attack. This use of last time information of value presents the larger division's operation to the aviation player who is playing at the Squadron level. This requirement presents the why behind the time sensitive intelligence and how it nests with the commander's decision points.

Fog of War

To force the aviation player to develop the situation, a fog of war mechanism was utilized. *Firebirds* utilizes the game *1805, Sea of Glory*, the fog of war mechanism. Its elegance at deception on blockades of ports could be utilized similarly for reconnaissance and security operation.[64]

---

[64] *1805: Sea of Glory.*

There are two ways that the fog of war units can be placed by the ground player in *Firebirds*. First, during setup, the ground force player may place six fog of war pieces along any avenue approach. This allows for the immediate ability to provide deception in the initial force array. By allowing forces to appear on all avenues of approach, the aviation player is forced to gain contact with formations to determine the ground player's main body.

The second way that the fog of war piece is introduced is through the ground player moving through a named area of interest (NAI) hexes. These hexes are preplaced on the map and visible by both players. They are located at forks in the roads, north of restricted terrain. These hexes provide the ground player the ability to add another fog of war piece to the board to deceive the aviation player. Unobserved NAIs greatly enhance the ground force player's ability to double the number of forces on a high-speed avenue of approach. This forces the aviation player to maintain presence in proximity to these hexes These two utilizations of fog of war pieces provide the foundations on how *Firebirds* integrates reconnaissance and security operations.

<u>Employ Aviation as Part of a Combined Arms Team</u>

Firebirds provides limited support to employing aviation as part of a combined arms team. The employment of FASCAM, which in this game are artillery delivered scatterable mines, was included to allow the aviation player to utilize limited combined arms. This allows the aviation player to plan for a simple scheme of counter-mobility. To utilize these obstacles effectively, the aviation player must ensure both overwatch of the obstacle and that the obstacles are tied to terrain. If the player does not tie the obstacles to terrain, the ground player can easily bypass obstacles instead of being forced to breach

them. The introduction of obstacles requires the ground player to ensure correct force packaging occurs during the initial setup. The ground player must ensure engineer units are within formation to prevent the movement of his forces from being stalled. The rules then further reinforce the value of overwatch of the obstacle by the aviation player's forces by allowing for automatic acquisition of the engineers attempting to breach the obstacle if an attack weapons team is within range. Utilization of FASCAM artillery provided a simple mechanism to accomplish multiple levels of depth in training combined arms.

Additionally, the scenario products allow for the discussion of the ARS in support of Large-Scale Combat Operations and division level combined arms. The visualization through the scenario products allows the players to understand how the ARS supports division operations. This presents the shift between counter insurgency brigade support to the "intense, lethal, and brutal"[65] fight when overmatch is not guaranteed.

<div align="center">Integrate Fire Support Planning and Coordination</div>

Integrating fire support planning and coordination is accomplished in *Firebirds* mainly through coordination measures defined by the rules and the scenario products. The scenario products define locations of Fire Support Coordination Line, No Fire Areas and ammunition limitations. The rules also restrict fires from being employed until the determination of the ground player's COA. The use of scenario products allows for both players to discuss fire support planning considerations.

---

[65] HQDA, FM 3-0, 1-3.

Determine Opposing Forces Organization, Equipment, and Threat Tactics

Firebirds accomplishes determination of opposing forces through the combination of victory conditions, ground force units, and ground player starting conditions. The *Firebirds* ground player controls an Armor Battalion. There are four ground type pieces. All ground pieces move using the same set of rules, getting movement benefits for utilizing the road network and survivability benefits when utilizing terrain. The four types of units are the armor platoon, the engineer platoon, air defense artillery, and the fog of war pieces. These ground units illustrate concepts such as high value versus high payoff targets and identification of force packages answer SIRs and indicators. The Air Defense Artillery is the high payoff target. If all four are removed from the board the aviation player now has complete freedom of action, making them high payoff targets. The victory conditions require the survivability armor platoons, making them high value targets. The victory conditions for the first and second COA, requires successful movement across the board. To support the mobility required, the ground player should package engineer breach potential obstacles with the armor formation. Identification of these engineer assets answer to an SIR to help indicate the ground players main effort. The third victory condition requires the specific locations the ground player needs to move the air defense artillery to key terrain as part of the larger effort to establish a defense. This calls for aviation player to determine differences in enemy COAs and what are those possible indicators. Then looking at those indicators determine specific information requirements that could further refine reconnaissance objectives during receipt of the mission. The identification of the enabling pieces in the game helps the aviation player develop situational awareness and identify which effort is being weighted.

The weighting of forces to achieve the mission is the first decision that the ground player makes. The two main decisions that are made by the ground player are the placement of the fog of war pieces and the task organization of units to support "The March."[66] This approach to addressing this task was to provide a clear way to teach the identification of a formation using game pieces. This also allowed for open ended game play rather than mandating a prescriptive formation type based on strict adherence to a particular threat template.

<u>Analyze Terrain and Map Reconnaissance</u>

Map reconnaissance and analyzing terrain is integrated into *Firebirds* through the scenario WARNO and board terrain types. The hex-based board allows for direct correlation between what a player is used to seeing on a two-dimensional map and the game itself. Through the variable victory conditions, the aviation players must determine how the ground player could potentially move from the three starting avenues of approach on the north side of the map, to which of the southern avenues of approach. When determining these avenues, the both players must examine which routes, crossing points, and opportunities for air defense artillery exist to establish protection points. The scenario products provide context for the listed named area of interest hexes. The rules encourage the ground player to utilize NAI's to achieve more deception through additional fog of war pieces and the aviation player to gain automatic acquisition.

There are limitations to aerial map reconnaissance due to the deliberately simplistic flight mode. The simplified aviation movement rules prevents corridors and

---

[66] Grau and Bartles, *The Russian Way of War*, 147-154.

terrain from being evaluated to ensure terrain masking from air defense threats. To make

a useful model for route planning, each hex would have to represent a smaller area then

the one square KM used in firebirds. Terrain altitudes and ability for concealment would

have to be modeled in greater detail. This two-dimensional approach still allows for

limited battle space geometry. Phase lines are placed every 10 hexes to allow for quick

reference for movement and sensor acquisition planning by aviation player. The aviation

player can maximize the range of the AWT using the last one third of to increase

survivability.

<div align="center">Plan Cavalry Operations</div>

Firebirds culminating training task is to reinforce the aviation player's ability to

plan cavalry operations. This accomplished through the five previous tasks. The scenario

for *Firebirds* includes, for the aviation player, planning the maneuver, sustainment,

intelligence, and fires, of a reconnaissance and security mission. This is then validated by

the aviation player playing against a thinking opponent, the ground player.

Assets are obviously very different between the aviation player and the ground

player. The aviation player utilizes a troops' worth of attack helicopters, two FARPs, and

the ability to utilize FASCAM obstacles. The ground force player had a battalion of

armor, four platoons of combat engineers, and 4 platoons of air defense artillery.

Firebirds is centered on the attack helicopters. The aviation player utilizes three

attack weapons teams. This represents six of the eight helicopters organic to a troop. The

other two helicopters remain out of play to demonstrate the maintenance factor. These

three AWTs are dice. The dice became an intuitive way to keep track of fuel in support of

the mission. Six-sided dice were used because this game was designed to be easily

exportable. After each turn the dice is turned down by one, for a total six fuel points. If the player runs out of fuel without returning the aircraft to the FARP piece, the aircraft is destroyed and removed from the board. This models an hour and half of total flight time per team. This allows the aviation player to balance the distance between reconnaissance efforts and the FARP and the amount of station time

The flight profile for the aircraft during *Firebirds*, models nap of the earth to contour flight. This was chosen based on the air defense threat from the ground player in the scenario. This further was simplified with the aircraft having a movement speed of ten hexes per turn. The simplicity of the flight model allows the player to train in the concepts of air cavalry operations without getting into the technical nature of aerodynamics or masking. These tasks would be better trained in live flight or simulators.

Gaining contact with the enemy is a critical aspect to an attack helicopter's role on the battlefield. *Firebirds* examines target acquisition by utilizing three different events. The first event is the trying to gain contact on an unknown target. This requires the aircraft to get within range of the enemy piece and roll for acquisition. If the ground player is utilizing roads, their units have a higher probability of being identified, than if the enemy is utilizing terrain to conceal movements. The next way to gain contact is through obvious sightings. Obvious sightings would be determined through conducting reconnaissance on a named area of interest, conducting overwatch of an obstacle, or an enemy air defense attempting and failing at its engagement. The final way to gain contact is through a battle hand over with another friendly piece. These three different ways to gain and maintain contact reinforce the fundamentals of reconnaissance for the aviation player.

To assist in planning sustainment operations in support of reconnaissance and security operations, *Firebirds* utilizes two FARP pieces. FARP pieces are purposefully simplified in this game to provide only an introduction to the players. The FARP pieces follow a simple rule. They must be moved after every time they are utilized. Each FARP piece represents a two-point refueling point with associated personnel and ammunition. This limits a single AWT to utilize a FARP piece at a time. Two FARPs force the aviation player to always ensure that an attack weapons team piece is forward. By keeping an AWT forward at all times this further reinforces fundamentals of reconnaissance and security and ensure continuous reconnaissance. It also further reinforces the movement of the FARP ensure survivability. The limited FARP mechanism allows for the concepts to be brought in without causing the detailed planning that would result in distraction.

The final aviation assets are the emplacement of FASCAM disrupt obstacles. The emplacement of obstacles achieves two main factors during gameplay. First, it allows for the disruption of ground forces. Specifically, it forces the ground player to have to plan where the engineer assets are in support of the main effort. This allows for the aviation player to identify the main effort through identifying high value targets. This builds onto the scenario WARNO and the determination of the ground forces' course of action. Secondly, this was included as a simple way to introduce aviators to integrating obstacles into combined arms. Through acquisition bonus of engineers trying to breach an obstacle, the obstacles reinforce the requirement to overwatch an obstacle emplacement.

Firebird uses a hex map to depict the area of operations. Each hex represents a one-kilometer area. The board is 60 hexes along its north south axis and 40 km on its east

west axis. The purpose of the orientation of the hexes is to allow greater ease in east and west lateral movements than north and south movements by placing the point of the hex on the north south axis. ATP 3-04.1 depicts that a troop of AH-64 helicopters can support two 7 KM sections of a screen line at a time.[67] This implies that with correct utilization of on-board sensors, of approximately 10KM range, the troop can cover an axis of 34 KM. This allows the ground player to exploit the boundaries of the 40 hex wide board and demonstrates the limitation of the aviation pure security mission. The depth of the board is 60 hexes. To simplify rules, the aviation player is limited, for the north south movement, to a nap of the earth flight profile speed. Because of this simplification, the FARP is placed between 10 to 20 KM from the screen line instead of the doctrinal 30 to 40 KM.[68]

Another limitation to the map space is the limitation of one unit allowed per hex. This was done to simplify combat resolution and have the focus for the aviation player to be trying to gain contact with the ground player's formations. The exception to this rule is when ground force units land on the NAI hex to allow for an additional fog of war piece to appear.

Total game length simulates 5 hours of operations. This was condensed for purposes of the game to ensure that the ground player made an effort to project forces to where the aviation force could gain contact prior to turn 10. Each game turn represents 15 minutes. *Firebirds* also minimizes the time for FARP turns. Instead the planning factor

---

[67] HQDA, ATP 3-04.1, 4-17.

[68] Ibid.

of 30 minutes, or two turns, *Firebirds* utilize 15 minutes, or one turn. This is done to help

negate the simplistic flight profile impacting station time. Fuel time is also limited due

the use of a 6-sided die as both a fuel tracker and helicopter team piece. 6-sided die as a

counter limits the aircraft to an hour and half. The 6-sided die, however, provides an

intuitive fuel counter that can easily be found in most homes. This provides support to

key design aspects of *Firebirds*, to create a game that can easily be built and modified in

the troop work area.

There are two main focuses for combat resolution in *Firebirds*. First is the

aviation player's unit's ability to gain and maintain contact. The unit's ability to develop

the situation before engagement is critical to support reconnaissance operations.

Acquisition is limited to a single hex per turn. It is further simplified with a 6-sided dice

role of 5 or less for a platoon on the roads and 4 or less for a platoon utilizing terrain.

This allows for the ground player to have the ability to utilize terrain to increase unit

survivability based on course of action. It also provides specific intelligence requirements

to the aviation player, reinforcing the tenants of reconnaissance. Limiting the acquisition

to a single hex per 15-minute turn represents aviation's ability to determine opposing

forces organization, equipment and threat tactics, using board game blocks instead of

pictures or computer graphics.

The second focus is the aviation unit's ability to engage the target. Target

engagements from attack aviation platforms in *Firebirds* represent multiple hellfire

engagements in the course of a 15-minute span. This is represented by a 6-sided dice roll

of 5 or less. The emphasis of *Firebirds* is not on the attack mission and is simplified so as

not distract from training tasks. There is no ammunition tracker because, with this limited

acquisition and engagement model, the attack weapons team should not run out of hellfire missiles. The number of vehicles being engaged every turn (3), times the number of turns before returning to the FARP (6), results in a number would less than the maximum number of hellfire missiles on an attack weapons team (32).

Air Defense Artillery acquisition and engagement are conducted in two different ways: moving and stationary. Acquisition for the Air Defense Artillery system, while moving, is set at 3 out of 6, or 50 percent, chance for success. This is purposely limited due to the turn-based rule system. By allowing a movement of 5 hexes on the roads and an additional 5 hexes of acquisition, the Air Defense Artillery system would close any gap against the attack weapons team without a response from the aviation player during testing. By reducing the odds of acquisition to a 50 percent chance, it gives the indicator to the aviation player that something is attempting to acquire. This represents the Aircraft Survivability Equipment inside the aircraft used to provide early warning to crews so that they would fall back to secondary battle positions. In contrast when the Air Defense Artillery is stationary on the key terrain, it represents the radar being utilized and becomes nearly impossible for the attack weapons team to attack the target.

<div align="center">Conclusion</div>

The six overarching concepts discussed in chapter three are modeled through the development of a simple rule sets with scenario products to provide depth to the simulation. Player analysis of the scenario product allows for the accomplishment of integrating of reconnaissance and security operations; employing aviation as part of a combined arms team; integrating fire support planning and coordination; determining opposing forces organization, equipment and threat tactics; analyzing terrain and

conducting a map reconnaissance; and planning cavalry operations. The simple rules allow for a visual and interactive simulation that allows for the positive reinforcement of the tasks to be modeled and trained. The imperfect situational awareness in the *Firebirds*, with the challenge of determining the enemy decision point, solidifies the aviation player's understanding of cavalry operations.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The development of *Firebirds* effectively models Air Cavalry techniques utilizing

a competitive wargame. *Firebirds*' foundation is based on current U.S. Army doctrine

which provided the tasks to be modeled. The development of this game incorporates

features from wargames like *Kriegspiel* and *1805's*.[69] This produced a dynamic game,

focused on the aviation player trying to gain situational awareness in an unknown

environment. *Firebirds* provides an easily exportable product that can be updated and

modified to fit varying situations.

In the development of *Firebirds*, the focus was on the simplicity of the rules while

still allowing for an exportable complex scenario to be trained. The current game can

easily be tailored to fit various unit training environments. Utilization of specific areas of

operations for the map and modification to the scenario products allow for a variety of

training outcomes. The target audience possesses the requisite skills to modify an

Operations Order and adjust the enemy task organization to adapt the increase *Firebirds*

relevancy.

The most successful design mechanism was the variable winning conditions. This

forces the aviation player to attempt to rapidly gain contact with the ground player's

forces. After achieving contact with the ground player's forces, the aviation player is then

forced to analyze the imperfect information in front of him and try to determine if any of

---

[69] *Kriegspiel. 1824; 1805: Sea of Glory.*

the indicators are met. This is all occurring as time and the ground player's formation is rapidly moving forward. This also allows the ground player to remain engaged with deception tasks. During the development of *Firebirds,* the variable winning conditions that center around the turn ten decision was one of last mechanisms to be added. It turned a game that resembled Space Invaders into a complex open-ended reconnaissance and security game.[70]

    Firebirds was developed to create an exportable training tool for the force. The scenario is easily adaptable and adjustable based on current threat templates and operational environments. The map can easily be made and modified, using various free Hex board creators and then printed on a unit's plotter. *Firebirds* used Hexographer found at, www.hexographer.com.[71] Any map can be generically mimicked in a hex map to highlight the key terrain to allow for conducting a wargame. Unit pieces can easily be made out of bent notecards. The three 6-sided dice are the only things someone would have to probably get from their house. This simplicity in modification and creation allows for customizable scenarios for effective training.

<div align="center">Recommendations</div>

    Firebirds is currently a limited scenario designed for officers directly out of flight school. The first possible change that could improve the applicability to audience is to bring in more combined arms. The addition of friendly armor, infantry, and fires, would

---

[70] *Space Invaders*.

[71] Inkwell Ideas, Inc., *Hexographer,* accessed 12 December 2018, www.hexographer.com.

allow for additionally applicability to senior aviators. This addition to the model would afford the ability to better train combined arms integration in support of Large-Scale Combat Operations. This would be applicable to both armor and infantry officers conducting ground cavalry operations.

Secondly, fires integration could be expanded to increase both players understanding of fires. Joint fires, utilizing fixed wing enablers, would provide a realistic way to incorporate fires in a heavy armor scenario. Similarly, changing the ground player's organization to include infantry, mission command, or logistic units more susceptible to field artillery, would be effective as well.

Manned-Unmanned Teaming was not incorporated with in *Firebirds* due classifications restrictions of threats against UAS limiting ability to model. If *Firebirds* included MUM-T, it would require the adjustment of how *Firebirds* approaches time and space. Redesign would have to include the RQ-7B UAS loiter time of over 8 hours.[72] This loiter time would allow for key decision or trigger of the player on when to begin utilizing AH-64s for reconnaissance or security missions. This would expand the reach of the aviation player and would require a larger board. Further, the RQ-7B could then be used to maintain reconnaissance over one of the primary avenues of approach. This would allow the aviation player to confirm SIRs earlier. However, without a credible threat to be included in the game play, it would provide unrealistic expectations of the capabilities of UAS in support of Large-Scale Combat Operations.

---

[72] HQDA, FM 3-04, 5-9.

Aerial route planning could be improved by the map board exploring the third dimension. Varying terrain would limit visibility and increase survivability, which would allow for increased realism in planning. Further it would allow for planning of varying flight profiles and airspeeds.

APPENDIX A

PARTS LIST

- 1: Firebirds Map

- 1: Firebirds complete rules

- 1: Firebirds abbreviated rules

- 1: Firebirds Scenario Order

- 2: 10-sided dice

- 3: 6-sided green dice

- 2: 6-sided red dice

- 12: Armor Platoon Markers

- 4: Air Defense Artillery Marker

- 4: Engineer Platoon Markers

- 4: FASCAM target marker

- 8: Obstacle pieces

COMPLETE RULES

0.0 Introduction: *Firebirds* is a hex board, single turn, based game with simple combat resolution. The game sets one troop of attack helicopters against one battalion of armor with enablers. Both players should read the scenario WARNO to prepare for their mission. There are 3 different missions for the ground forces, each with a different winning criterion. The mission assigned to the ground player is only known by the ground player, and he should keep this secret. It is up to the aviation player to determine the ground player's course of action so as to advise the notional division commander whether or not to commit the reserve. Once the mission is understood, begin the game by setting up the respective sides of the board. Each turn begins with the aviation player and end upon completion of the ground player's turn. The focus of this game for the aviation player is to gain and maintain contact with the ground player's force. The focus of the ground player is balance survivability and speed to accomplish the assigned mission. At the end of the game only one person will get to yell "I AM THE GREATEST."

0.1 Scale:
0.1.1 Individual Hex: 1 Square KM.
0.1.2 Board Size: 40 KM x 60 KM.
0.2 Turn time: 1 turn represents 15 minutes.

1.0 Board

Blank	Restricted	High Terrain	Road	Named Area of Intrest	River
Phaseline		Avenue of Approach	Crossing Points	Off board FARP	

1.1 Terrain types:

1.1.1 Blank Hexes: open movement, only one-unit piece allowed in each hex.

1.1.2 Restricted terrain: only air units allowed.

1.1.3 High Terrain allows for ADA increased LOS.
1.1.4 Hex with FASCAM disrupt added. FASCAM green cube and linear surrounding

hexes. When unit drives over obstacle, a roll of 3 or below will destroy unit and obstacle will be removed. With a roll of 4 or above the obstacle remains emplaced and unit is able to continue movement with no affect.

1.1.5 Road: provides a (+2) movement bonus for ground unit if all movement is conducted on a route depicted by road hexes.

1.1.5.1 Gray road depicted in the hexes has to direct into the next hexes for it to be considered a route. A route of 1 to 3 or 2 to 3 are considered a route. 1 to 2 are not a route and would not get a road bonus.

1.1.6 Named Area of Interest (NAI)

1.1.6.1 Ground units that stop on a NAI are awarded a Fog of War unit on that Hex. This is the only time 2 units can be placed on the same hex at the same time.

1.1.6.2 If a ground unit(s) enters an NAI, either stopping or driving through, and an Attack Weapons Team (AWT) is within and remains within observation range, the AWT is able gain and maintain contact with one ground unit with no acquisition roll requirement.

1.1.6.2.1 If the AWT was in contact with a different ground unit, contact is now lost with the original ground unit for the new unit acquired.

1.1.7 River: Restricted terrain, can only be crossed at bridge sites or by air units.

1.2 Scenario markers

1.2.1 Phase line's (PL) are used to support the indicators and intelligence requirements

1.2.2 Avenues of approach (AA) provide starting limitations for ground units. AAs are separated by north south restricted terrain.

1.2.3 Crossing points. Ground units that cross south past the bridge are considered safe. The type of the unit is not revealed to the aviation player until the end of the game.

1.2.4 Only allowed FARP location after ground units cross the River Magnus.

2.0 Set-up

2.1 Ground player

2.1.1 Determination of Course of Action: Ground player rolls a six sided die to determine which scenario COA will be utilized. (refer to 3.0). COA remains secret from the aviation player until end of game.

2.1.1.1 MDCOA A: 1 or 2

2.1.1.2 MDCOA B: 3 or 4

2.1.1.3 MLCOA: 5 or 6

2.1.2 Unit Set-up

2.1.2.1 6 to 9 Armor pieces must be placed inside AA2.

2.1.2.2 Up to 6 fog of war pieces may be placed during setup.

2.1.2.3 All other pieces have no restrictions on AAs.

2.1.2.4 All pieces must between PL Purple and N to Matilyn.

2.2 Aviation Player

2.2.1 FARP units must be place south of PL Red.

2.2.2 Air units must be placed within 6 hexes of FARP units and south of PL Red.

2.2.2.1 Air units placed on FARP pieces at the start will not start fuel counter until departing FARP for the first time.

3.0 Mission/End Criteria

3.1 Game ends after 20 turns or all units of one side eliminated

3.2 Ground player win criteria

3.2.1 MDCOA A (Disruption of Freedom Division along AA A): 6 Armor PLTs (2 Companies) cross the River Lucy across crossing points labeled A.

3.2.2 MDCOA B: (Disruption of Freedom Division along AA B): 6 Armor PLTs (2 Companies) cross the River Lucy across crossing points labeled B.

3.2.3 MLCOA (Establish a Defense): 2 Armor PLTs between River Magnus and River Lucy; minimum of 2 high terrains occupied by ADA units; 9 Armor Platoons on board; no remaining turns, end of turn 20.

3.2.4 Determination of COA: Commit Freedom Division's Reserve.

3.2.4.1 If aviation player correctly determines the ground player's COA no later than turn 10, the ground player win criteria increases by 2 armor PLTs. (6 to 8).

3.2.4.2 If aviation player incorrectly determines the ground player's COA no later than turn 10, the ground player win criteria decreases by 1 armor PLT. (6 to 5).

3.2.4.3 Only one attempt at COA determination by the aviation player is allowed, and only in turns 1 through 9.

3.2.4.4 Rules 3.2.4.1 and 3.2.4.2 do not apply if the aviation player does not attempt to determine COA.

3.3 Player win Criteria

3.3.1 Aviation Player wins if all armor units are eliminated or the ground player is unsuccessful achieving COA after 20 turns.

4.0 Units

Attack Weapons Team and Fuel counter	Forward Arming and Refueling Point (FARP)	Obstacle	FASCAM Target Marker
Armor Platoon	Air Defense Artillery Platoon	Engineer Platoon	Fog of War

4.1 Aviation Player

4.1.1 Attack Weapons Team: 3 per game.

4.1.1.1 Movement: 10 hexes per turn, terrain does not affect movement.

4.1.1.2 Acquisition Range of 10 hexes; Open terrain: dice roll of 4 or less; Road Terrain: dice roll of 5 or less.

4.1.1.3 Target Engagement Range/Success: Range of 8 hexes; dice roll of 5 or less.

4.1.1.4 Fuel: Fuel counter begins on 6 and decreases Range/Success: by 1 as per 5.2.6.

4.1.2 Artillery FASCAM: 4 per game.

4.1.2.1 Fire missions are conducted during the Call for Fire turn. Indicate this by placing a cube on the mission hex.

4.1.2.2 Maximum of 2 fire missions can be called per turn.

4.1.2.2 Fire missions execute the following turn.

4.1.2.2.1 Linear obstacle is place to the east and west hexes of fire mission, for a total of 3 hexes of disruption obstacles.

4.1.2.2.2 Any unit that is in one of the 3 hexes upon fire execution is immediately destroyed.

4.1.2.2.3 Each obstacle hex, remains in place until obstacle is cleared by an Engineer unit or any non-fog of war unit is destroyed by the obstacle.

4.1.2.2.4 Bypassing obstacles: Each units entering into a hex with an obstacle marker rolls a die to see if they are able to bypass.

4.1.2.2.4.1 Roll of 1-3; unit destroyed.

4.1.2.2.4.2 Roll of 4-6; unit bypasses obstacle, no degradation to movement

4.1.3 FARP: 2 per game.

4.1.3.1 Movement: 2 hexes per turn.

4.1.3.2 Maximum of 1 AWT allowed at FARP unit per turn.

4.1.3.3 Upon a ground force unit crossing River Magnus; the next turn the FARP unit pieces are removed from the board.

4.1.3.4 ASB FARP (off map) has no limit on AWT's at the same time.

4.1.3.5 ASB FARP is located one hex off southern border of the map.

4.2 Ground Player

4.2.1 Armor Platoon; 12 per game.

4.2.1.1 Movement: 3 hexes open terrain; 5 hexes if all movement is completed on roads.

4.2.2 ADA Platoon; 4 per game.

4.2.2.1 Movement: 3 hexes open terrain; 5 hexes if all movement is completed on roads.

4.2.2.2 Acquisition Range/Success: range of 5 hexes; roll of 3 or less.

4.2.2.2.1 Acquisition Range/Success: on high terrain: range of 12 hexes; roll of 5 or less.

4.2.2.3 Target engagement Range/Success: range of 5 hexes; roll of 5 or less.

4.2.2.3.1 Target engagement Range/Success on high terrain: range of 12 hexes; roll of 5 or less.

4.2.2.3.2 During any target engagement, successful or unsuccessful, ADA Platoon is observable if an AWT is within acquisition range.

4.2.3 ENG Platoon: 4 per game.

4.2.3.1 Movement: 3 Hexes open terrain; 5 hexes if all movement is completed on roads.

4.2.3.2 Obstacle Breach: If the Engineer is moved adjacent to an obstacle, at the end of the turn, the one obstacle hex is cleared.

4.2.3.2.1 During breach, engineer platoon is automatically observable.

4.2.4 Observed or not observed.

4.2.4.1 All ground units are placed facing only the ground player.

4.2.4.2 If a ground unit is observed the piece is laid flat so the aviation player can see it.

4.2.4.3 Observed pieces return to facing ground player once the aviation player is no longer observing, based on distance or choosing to acquire a different unit. See rule X regarding aviation player observation.

5.0 Game Play

5.1 Turn Sequence: Each Turn begins with the aviation player and ends upon completion of the ground player's turn.

5.2 Aviation player's turn

5.2.1 Execute fires: If a fire mission was called the previous turn, obstacles are now emplaced. Obstacles are placed to the adjacent east and west hex of fire mission marker.

5.2.2 Air movement.

5.2.2.1 Aircraft with fuel may move.

5.2.3 Observation.

5.2.3.1 Gaining Contact:

5.2.3.1.1 Aircraft within Target Acquisition range and successful dice roll.

5.2.3.1.2 Aircraft within Target Acquisition range and another friendly unit is currently in contact with target.

5.2.3.1.3 Aircraft within Target Acquisition range and ground player's unit enters an NAI during ground player's turn.

5.2.3.1.4 Aircraft within Target Acquisition range of ADA unit and ADA attempts to engage during ground player's turn.

5.2.3.1.5 Aircraft within Target Acquisition range of ENG unit and ENG Unit attempts to breach during ground player's turn.

5.2.3.1.6 Aircraft that acquire Fog of War, Fog of War unit is removed from the board.

5.2.3.2 Maintaining contact.

5.2.3.2.1 Contact is maintained as long as the unit is with in acquisition range during the start and end of the turn.

5.2.3.2.2 Contact is lost if observing unit acquires a different unit or distance between units becomes too great.

5.2.3.2.3 Units in contact with the aviation player's air units are flipped up to identify what type of unit.

5.2.4 Engagement.

5.2.4.1 Target must be acquired by a friendly unit and within engagement range; successful dice roll.

5.2.4.2 One engagement attempt per aviation unit per turn.

5.2.4.3 Destroyed units remain on the board face up, and if on road (-1) to ground movement for units moving through that hex.

5.2.5 Call for Fire.

5.2.5.1 Fire Missions must be within observation range of aviation unit.

5.2.5.2 Total of 4 fire missions can be utilized during the game.

5.2.5.3 Maximum of 2 missions per single round.

5.2.5.4 Fire missions execute on the next turn during execution of fires.

5.2.5.5 Fire missions can only be utilized if the aviation player states the ground player is executing a MDCOA.

5.2.6 FARP Refuel, Movement or set.

5.2.6.1 FARP units are refueling, moving, or set.

5.2.6.2 FARP units must move after every time they conduct refueling.

5.2.6.3 Air units must land at the FARP to refuel.

5.2.6.4 An air unit is out of fuel if at the start of the turn the counter is on one and is unable that turn to land on the FARP.

5.2.6.5 Air units that land on the FARP reset their fuel at the end of the following turn.

5.2.6.6 Air units that are on a FARP do not count down their fuel indicator.

5.2.6.7 At the end of the FARP turn, all air units not on a FARP count down one fuel indicator point.

5.2.7 Determine Enemy COA.

5.2.7.1 Air Player gets one chance prior to turn 10 to choose enemy COA.

5.3 Ground Player's Turn

5.3.1 Movement: Ground movement done in conjunction with unit movement value and terrain type.

5.3.2 ADA acquisition.

5.3.2.1 Gaining Contact.

5.3.2.1.2 ADA within Target Acquisition range and successful dice roll.

5.3.2.1.3 ADA within Target Acquisition range and another friendly unit is currently in contact with target.

5.3.2.2 Maintaining contact.

5.3.2.2.1 Contact is maintained as long as the unit is with in acquisition range during the start and end of the turn.

5.3.2.2.2 Contact is lost if observing unit acquires a different unit or distant between units becomes too great.

5.3.3 ADA Engagement.

5.3.3.1 Target must be acquired by a friendly unit and within engagement range; successful dice roll.

5.3.3.2 One engagement attempt per aviation unit per turn.

5.3.4 Engineer Breach: Engineer assets adjacent to an obstacle can breach one obstacle a turn. Unit is flipped observable until end of the turn or remains observed if an aviation unit gains contact with it.

Rules

- **Units:**
  - **Air Units: Attack Weapons Team**
    - Movement: 10 hexes per turn;
    - Fuel: 6 turn counter; if unit does not make it to FARP on 6th turn the piece is lost
    - Target Acquisition:
      - Range 10 Hexes
      - Only one hex can be observed at a time
      - Open terrain roll of 4 or less acquires the target
      - Road roll of 5 or less to acquire
      - If enemy remains within 10 KM (hexes) contact is maintained
      - Air unit losses contact if enemy exceeds 10 KM (hexes)
    - Target Engagement:
      - Range 8 hexes
      - A roll of 4 or less destroys the target
      - Target Destroyed remains on the Board, -1 to movement over the hex if on road
      - Only can engage after a successful acquisition
      - If other friendly unit is currently maintaining contact with an enemy unit in range, target can be engaged
    - Call for fire: (FASCAM)
      - Target location within 10 Hexes of AWT
      - Emplace straight-line obstacle on either side of the target location
      - Total: of 4 FASCAM rounds per game
      - Multiple (2) Rounds can be used per fire mission
    - Total: 3 Attack weapons teams
  - **FARP Unit:**
    - Movement: 2
    - FARP must move after use by AWT
    - FARP cannot be reused in the same location
    - Total: 2
    - Utilize off MAP FARP after enemy force cross River Magnus

- **Ground units: Platoon of Armor**
  - Movement: 3 hexes open terrain per turn
  - 5 hexes on roads
  - 2 hexes acquisition of FARP roll of 5 or less for kill
  - Total: 12

- **2S6:**
  - Movement: 3 hexes open terrain per turn
  - 5 hexes on roads
  - Acquisition: 5 Hexes; roll of 3 or less
    - High terrain 12 roll of 5 or less
  - Attack: 5 hexes; roll of 4 or less
    - High terrain 12
  - Total: 4

- **ENG CO**
  - Movement 3 open terrain
  - 5 hexes on roads
  - Clears a single obstacle hexes adjacent to location per turn
  - Total: 4

Air player starts each turn
1. Execute fires
2. Air movement of
3. Observation
4. Engagement
5. Call for Fire
6. FARP Refuel, Movement or set
7. Determine Enemy COA, Prior to turn 10 choose AA to commit the reserve (one time only, -3 Armor units in that AA, if wrong +1 armor across)

Ground Turn
1. Place pieces on the board
2. Movement
3. ADA acquisition engagement
4. Engineer breach

- **Board:**
  - Blank Hexes: open movement, one unit piece allowed in the space
  - Restricted terrain: only air units.
  - High Terrain allows for ADA to increased LOS. (H)
  - Obstacle Hex: FASCAM blue square and linear surrounding hexes. When unit drives over obstacle, a roll of 3 or below will destroy unit and obstacle will be removed. 4 or above obstacle remains emplaced and unit
  - Road:
  - D hexes: allows ground unit to add a fog of war piece
    - each unit can only go through the same D hex once
    - Units can enter different D hexes
  - FARP piece: resets air units movement counter to 6

- **Setup**
  - Ground units rolls dice to determine COA Ave. of Approach selection
  - 1-2: A; 3-4 B; 5-6 MLCOA Ground unit keeps this secret until EOM
  - Ground Units can place a maximum 9 in area 2 minimum of 6. Maximum of 6 in 1 and 3. Total placed cannot exceed 12. Units can be placed on any turn.
  - 6 FOG OF WAR pieces can be placed during setup
  - Ground Units are behind north PL
  - Air units can be placed with in 6 hexes of the FARP hex. All 3 start with 6 fuel turn counter
  - Air units start south of south PL

- **End criteria**
  - A/B: Ground Forces objective is to disrupt air units by maneuvering 2 company plus size element (7 Armor Platoons pieces) past the river in assigned AA to disrupt ABCT (Not on board).
  - MLCOA: min 2 PLTS between the river, 2 of 4 High terrains occupied by ADA and 10 PLTS of Armor total
  - Attack reconnaissance Troop conducts screen ground forces for 20 turns from crossing the river IOT allow reaction time and maneuver space to friendly forces

APPENDIX D

SCENARIO

WARNO 2 for Operation ORDER 19-001: Operation FIREBIRDS

References:

A: Maps and Charts: FIREBIRD Special Map (Game Board)

Time Zone Used throughout the OPORD: ZULU

Task Organization: See Annex A (Task Organization)

1. <u>Situation.</u>

a. <u>Area of Interest.</u> Area of interest (AOI) to the Freedom Division is north of the river Magnus. There exist 3 avenues of approach (AAs) the Horde is able to utilize for a spoiling attack prior to the Freedom Division's main effort. These 3 AAs are north to south Battalion size mobility corridors ending at the Division's Area of Operations (AO). AA1 (East Corridor) and AA3 (West Corridor) are able to facilitate up to 2 Armor Companies. AA2 (Center) is able to facilitate an Armor Battalion's movement.

b. <u>Area of Operations.</u> The Freedom Division's Area of Operations (AO) is broken down into Consolidation Area, PL White to PL Gray (Not depicted), Close Area, PL Gray to PL Black (Not depicted) and Deep Area PL Black to PL Green (Game Board). PL Green is the FSCL.

1. <u>Terrain.</u>

a. <u>Obstacles.</u> The deep area of the AO is defined by two east to west running rivers, River Magnus to the north and River Lucy to the south. River Magnus has 10 crossing sites. River Lucy has 6 crossing sites, 3 per AAs into the Division Close Area. Throughout the Deep Area exists rough terrain unable to be easily traversed by Armor Formations.

b. <u>Avenues of Approach.</u> Two main AAs connect the Division's Close and Deep areas. They are AA Alpha and AA Bravo. These AA's both start at River Lucy. These mobility corridors provide an unrestricted route directly into the Division close Area. There are no cross-mobility corridors between the AAs Alpha and Bravo.

c. <u>Key Terrain.</u> There are two types of key terrain in the Division Deep Area. There are four high terrain locations. These areas of high terrain allow for Air Defense Artillery (ADA) to utilize radar unhindered from wooded terrain and provided a maximum vantage point. There are 12 locations that allow cross mobility movement.

Expect the enemy to use deception operations originating at these locations.

        d. <u>Weather</u>: Great!

   c. <u>Enemy Forces.</u> 1st BTG (Horde) is currently establishing a hasty defense north of PL Green in the town of Matilyn. 1st BTG estimated strength of 75% after friendly Air Interdiction over the past 3 days. 1st BTG has seized the industrial factories and population centers. 1st BTG priority of efforts is to improve defensive position through establishment of obstacle belts and positioning of air defense assets to create an Integrated Air Defense. The control of Matilyn supports the Horde's theater mission of the delegitimizing the government of Charchar and annexing key ports and industrial bases.

        1. <u>Most Likely Course of Action (MLCOA).</u> 1st BTG conducts a defense in depth to consolidate gain from its seizure of Matilyn. To accomplish this 1st BTG will utilize an armor BN to establish defensive position along linear obstacles River Magnus and River Lucy. They will reinforce these positions by placing Air Defense Assets on as many of the four high terrain locations as possible. Once these nodes are established, they will establish an Air Defense in-depth to mitigate the advantage provided by friendly attack aviation.

        2. <u>Most Dangerous Course of Action (MDCOA).</u> 1st BTG conducts a spoiling attack to disrupt Division's ability to conduct offensive operations. To accomplish this, 1st BTG will send 1/1 AR BN utilizing AA1, 2 or 3 and continuing south to AA Alpha or AA Bravo. 1/1 AR BN will then conduct an attack into our northern flank utilizing the Horde's long-range fires to achieve mass and disrupt our ability to transition to the offense. Engineers will then create an obstacle zone along the AA and destroy crossing sites.

2. Mission. NLT H+24, Freedom Division attacks to seize Matilyn IOT defeat 1st BTG forces and restore international borders.

3, Execution.

   a. <u>Commander's Intent.</u> This operation will allow Freedom Division to secure key terrain ISO the Theater mission to defeat Horde's invasion of Charchar.
      Key Tasks:
        Screen in the Division's Deep Area to determine ECOA and provide reaction time and maneuver space.
        Control of crossing sites across River Lucy and River Magnus.
        Coordinated Attack by two ABCT's to defeat 1st BTG at Matilyn.
      End State:
        Friendly. Freedom Division is above 70 percent and postured to transition to the defense.

Enemy. 1ˢᵗ BTG is defeated at Matilyn and Horde forces are unable to conduct a successful counter attack.

Terrain. Freedom Division controls Matilyn and crossing sites across River Lucy and Magnus's remain intact.

Civilian. Matilyn infrastructure remains intact, Charchar begins transition to restore legitimate governance.

b. Concept of the Operations. To be produced during COA Development

1. Reserve. The reserve (2/2 AR) is located with the Division Main. The reserve has the following priorities of planning:

a. Attack to destroy 1/1 AR along AA Alpha. Decision point. Enemy commits a company size Armor formation across Alpha series Crossing sites of River Lucy.

b. Attack to destroy 1/1 AR along AA Bravo. Decision point. Enemy commits a company size Armor formation across Bravo series Crossing sites of River Lucy.

c. Reinforce Freedom Division ME attack on Matilyn

2. Scheme of Mobility/Counter-mobility. Freedom division engineers will ensure mobility across River Lucy and Magnus. Emplacement of obstacles in the division deep area by FASCAM will only be utilized if the Enemy executes the MDCOA.

3. Scheme of Fires. FSCL is PL Green. No Fire Area's (NFA's) are placed over all crossing sites of River Lucy and Magnus. FSCL is PL Green.

4. Scheme of Intelligence Support. Collection in Division's deep area from PL Black to PL Green will focus on crossing points of Lucy and Magnus, and key terrain. Division efforts collection efforts will focus on determining ECOA. PIRs are as follows:

a. PIR:

1. Will the enemy attack along AA Alpha? Last Time Information of Value (LTIOV) H+2:30 (Turn 10).

2. Will the enemy attack along AA Bravo? LTIOV: H+2:30 (Turn 10)

3. Will the enemy establish a hasty defense in division Deep Area? LTIOV H+6 (Turn 20

b. SIR to PIR Diagram

SIR	Indicator	PIR
Enemy conducting movement on roads south of PL Yellow	Enemy forces rapidly moving south	Will the enemy attack along AA Alpha? LIOTV H+2:30 (Turn 10)
Enemy ADA assets distributed evenly through formations		
2+ Company (7 PLT) sized Armor formation in AA1 and AA2	Majority of enemy forces in eastern side AO	
3+ Eng assets in AA1 and AA2		
1+ Company (4 PLT) not on AA3 South of PL Blue		
Enemy conducting movement on roads south of PL Yellow	Enemy forces rapidly moving south	Will the enemy attack along AA Bravo? LIOTV H+2:30 (Turn 10)
Enemy ADA assets distributed evenly through formations		
2+ Company (7 PLT) sized Armor formation in AA3 and AA2	Majority of enemy forces in western side AO	
3+ Eng assets in AA3 and AA2		
1+ Company (4 PLT) not on AA1 South of PL Blue		
Enemy formations transition of roads prior to PL Yellow	Enemy focused on survivability	. Will the enemy establish a hasty defense in division Deep Area? LIOTV H+5 (Turn 20)
Engineer assets spread through formation		
2+ high terrain locations occupied by ADA	Enemy utilize liner obstacles to establish a defense	
Only one Armor company crosses between PL Yellow and PL Red	Enemy establishes a disruption zone	
2+ Engineer PLTs in between PL Yellow and PL Red		

c. Task to Subordinate Units.

    1. Attack Reconnaissance Squadron

a. Conduct Zone Reconnaissance between PL Black and PL Green until H+5:00 (Turn 20) IOT provide Division reaction time and maneuver space.

b. BPT transition to a guard if enemy armor BN commits to MDCOA.

2. Aviation Support Battalion

a. Push class III and Class V to FST FARP

b. O/O establish FARP south of PL Black if enemy conducts MDCOA.

3. F/Freedom (Gray Eagle): conduct Area Reconnaissance on NAI 2000, 2001, 2002

4. DIVARTY: O/O provide FASCAM support of mobility/counter mobility plan.

5. 2 BCT: provide one Armor Battalion TACON to DIV Main to serve as the DIV reserve.

d. Coordinating Instruction.

1. Fire Support Coordination: FSCL is PL Green

2. Bypass criteria: Bypass dismounted infantry.

3. Risk Reduction Control Measures: FARP personnel North of PL Black must immediately withdraw upon enemy crossing the River Magnus.

4. Sustainment. ARS will provide internal FARP support north of PL Black. ASB will O/O establish FARPs south of PL Black. BSB will conduct support to PAA ISO DIVARTY

5. Command and Signal

a. Command

1. Succession of Command: DCG-M, DCG-S

2. Anticipated Decision. Commitment of the reserve along AA Alpha or Bravo.

b. Control

1. Reports: Ensure all individual Enemy Armor, Eng, ADA assets are reported with description, location, direction of travel and activity.

GAME BOARD
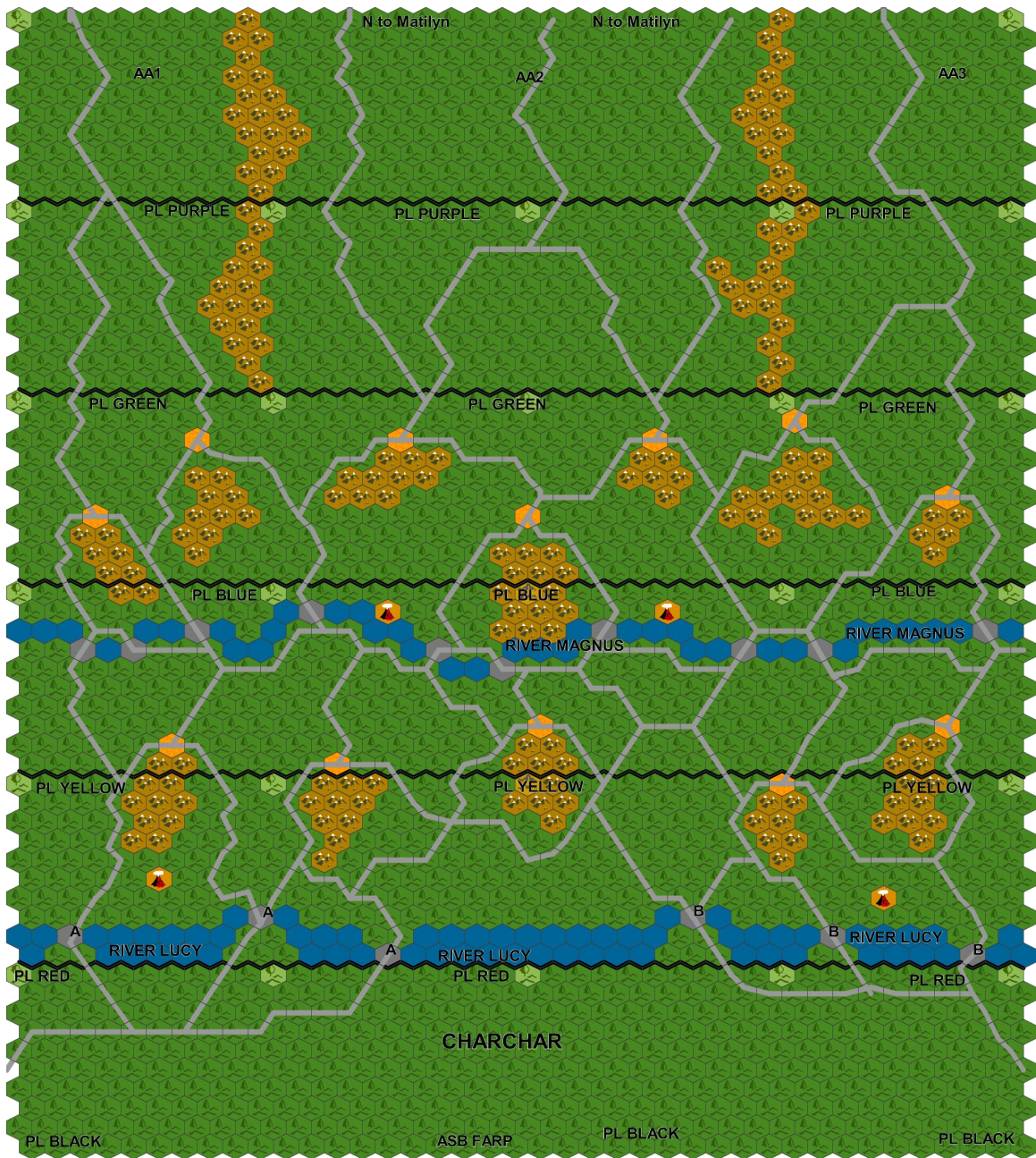
BIBLIOGRAPHY

Books

Grau, Lester W., and Charles K. Bartles. *The Russian Way of War*. Fort Leavenworth, KS. Foreign Military Studies Office, 2016.

Koster, Ralph. *A Theory of Fun for Game Design*. 2nd ed. Sebastopol, CA: O'Reilly Media, 2014.

Perla, Peter. *Peter Perla's The Art of Wargaming*. Annapolis, MD: The United States Naval Institute, 2011.

Sabin, Philip. *Simulating War: Studying Conflict through Simulation Games*. 2nd. ed. New York: Bloomsbury Academics, 2014.

Government Documents

Headquarters, Department of the Army. Army Doctrine Publication 1-02, *Terms and Military Symbols*. Washington, DC: Department of the Army, September 2014.

———. Army Techniques Publication 3-04.1, *Aviation Tactical Employment.* Washington, DC: Department of the Army, April 2016.

———. Army Techniques Publication 3-04.17, *Techniques for Forward Arming and Refueling Points.* Washington, DC: Department of the Army, June 2018.

———. Field Manual 3-0, *Operations.* Washington, DC: Department of the Army, October 2017.

———. Field Manual 3-04, *Army Aviation.* Washington, DC: Department of the Army, July 2015.

———. Field Manual 3-98, *Reconnaissance and Security Operations.* Washington, DC: Department of the Army, July 2015.

———. Field Manual 6-0, *Commander and Staff Organization and Operations.* Washington, DC: Department of the Army, May 2014.

———. Training Circular 3-04.4, *Fundamentals of Flight.* Washington, DC: Department of the Army, December 2016.

———. Training Circular 7-100. *Hybrid Threat.* Washington, DC: Department of the Army. November 2010.

U.S. Army Command and General Staff College. Student Text 20-10, *Master of Military Art and Science (MMAS) Research and Thesis.* Ft. Leavenworth, KS: U.S. Army Command and General Staff College, August 2018.

U.S. Army Training and Doctrine Command (TRADOC). TRADOC Pamphlet 525-3-6, *The U.S. Army Functional Concept for Movement and Maneuver 2020-2040*. Fort Eustis, VA: Training and Doctrine Command, February 2017.

———. TRADOC Pamphlet 525-8-2, *The U.S. Learning Concept for Training and Education 2020-2040*. Fort Eustis, VA: TRADOC, April 2017.

Games

1805: Sea of Glory. Phil Fry. GMT Games, 2009.

1944: Race to the Rhine. Jaro Andruszkiewicz and Waldek Gumienny. Board game. Phalanx, 2014.

Aftershock: A Humanitarian Crisis Game. Rex Brynen and Thomas Fisher. Board game. The Game Crafter, 2015.

Air Cav. Tony Merridt. Board game. Westend games, 1985.

Air and Armor. Bruce Maxwell. West End Games, 1986.

Axis and Allies Europe 1940. Larry Harris, Jr. The Avalon Hill Game Co., 2010.

Blazing Skies. David Jackson. Board game. U.S. Army Command and General Staff College, 2019.

Carcassonne. Klaus-Jurgen Wrede. Z-Man Games, 2013.

Carpathians' Eagles. Ovidiu Popescu. Board game. U.S. Army Command and General Staff College, 2019.

Combat Commander Europe. Chad Jensen. Board game. GMT Games, 2006.

Congo. Justin Williamson. Board game. U.S. Army Command and General Staff College, 2018.

Death Can Wait. Caitlin Ebbets. Board game. U.S. Army Command and General Staff College, 2018.

Dominion. Donald X. Vaccarino. Board game. Rio Grande Games, 2008.

Fire in the Lake: *Insurgency in Vietnam*. Mark Herman and Volko Ruhnke. COIN Vol. 4. GMT Games, 2014.

Friedrich. Richard Sivél. Rio Grande Games, 2004.

Gas Attack. John Bradley. Board game. U.S. Army Command and General Staff College, 2019.

High Treason: The Trial of Louis Riel. Alex Berry. Board game. Victory Point Games, 2016.

Ides of War: War Machines of WWII - A Program Management and Force Management Game Intended to Test Theories of Force Quality Versus Quantity in the Axis-Soviet Front of WWII. Bryan Fanick. Board game. U.S. Army Command and General Staff College, 2019.

Kriegspiel. 1824. B von Reisswitz, Translated by Bill Leeson. Board game. Netherwood Dalton, 1983.

Motorcade Showdown. Bill Miller. Board game. U.S. Army Command and General Staff College, 2019.

Napoléon 1806. Denis Sauvage. Golden Bell Entertainment, 2017.

Netrunner. Richard Garfield. Board game. Wizards of the Coast, 2012.

Next Year is Now. Jose Dominguez. Board game. U.S. Army Command and General Staff College, 2018.

Paths of Glory: The First World War. Ted Racer. GMT Games, 1999.

Peacekeeping Purgatory: A Simulation of the Conflict in The Eastern Democratic Republic of Congo Since 2015. Justin Williamson. Board game. U.S. Army Command and General Staff College, 2018.

Quebec 1759. Joseph Henderson. Board game. U.S. Army Command and General Staff College, 2019.

Squad Leader: The Game of Infantry Combat In WWII. Board game. Avalon Hill, 1977.

Terraforming Mars. Jacob Fryxellisus. Fryx Games, 2016.

Triumph & Tragedy: European Balance of Power 1936-1945. Craig Besinque. GMT Games, 2016.

Vietnam: 1965-1975. Ted Koller and James Talbot. Victory Games, 1984.

Yom Kippur. Dean Essig and Al Sandrick. The Gamers, 1995.

Other Sources

Inkwell Ideas, Inc. *Hexographer*. Accessed 12 December 2018. www.hexographer.com.

Morris, Kelly P. "Air Cavalry Leaders Course Shapes Air Ground Reconnaissance." U.S. Army, December 2015. Accessed October 2, 2018. https://www.army.mil/article/159622/air_cavalry_leaders_course_shapes_air_gro und_reconnaissance.

Nishikado, Tomohiro. *Space Invaders*. Taito Corporation. Midway Games, 1978.

Pate, Kelly P. "Aviation Restructure Initiative: Balancing Act Seeks to Get Force Right." U.S. Army, August 2014. Accessed November 1, 2018. https://www.army.mil/article/131869/aviation_restructure_initiative_balancing_ac t_seeks_to_get_force_right.