Future Small Arms Ammunition Design Bullet Shape And

Advanced energetic materialsâ€"explosive fill and propellantsâ€"are a critical technology for national security. While several new promising concepts and formulations have emerged in recent years, the Department of Defense is concerned about the nationâ€™s ability to maintain and improve the knowledge base in this area. To assist in addressing these concerns, two offices within DOD asked the NRC to investigate and assess the scope and health of the U.S. R&D efforts in energetic materials. This report provides that assessment. It presents several findings about the current R&D effort and recommendations aimed at improving U.S. capabilities in developing new energetic materials technology. This study reviewed U.S. research and development in advanced energetics being conducted by DoD, the DoE national laboratories, industries, and academia, from a list provided by the sponsors. It also: (a) reviewed papers and technology assessments of non-U.S. work in advanced energetics, assessed important parameters, such as validity, viability, and the likelihood that each of these materials can be produced in quantity; (b) identified barriers to scale-up and production, and suggested technical approaches for addressing potential problems; and (c) suggested specific opportunities, strategies, and priorities for government sponsorship of technologies and manufacturing process development.
July 2019 Printed in BLACK AND WHITE The Army's Weapon Systems Handbook was updated in July 2019, but is still titled "Weapon Systems Handbook 2018." We are printing this in black and white to keep the price low. It presents many of the acquisition programs currently fielded or in development. The U.S. Army Acquisition Corps, with its 36,000 professionals, bears a unique responsibility for the oversight and systems management of the Army's acquisition lifecycle. With responsibility for hundreds of acquisition programs, civilian and military professionals collectively oversee research, development and acquisition activities totaling more than $20 billion in Fiscal Year 2016 alone. Why buy a book you can download for free? We print this so you don't have to. We at 4th Watch Publishing are former government employees, so we know how government employees actually use the standards. When a new standard is released, somebody has to print it, punch holes and put it in a 3-ring binder. While this is not a big deal for a 5 or 10-page document, many DoD documents are over 400 pages and printing a large document is a time- consuming effort. So, a person that's paid $25 an hour is spending hours simply printing out the tools needed to do the job. That's time that could be better spent doing mission. We publish these documents so you can focus on what you are there for. It's much more cost-effective to just order the latest version from Amazon.com. SDVOSB If there is a standard you would like published, let us know. Our web site is usgovpub.com
Operations in Afghanistan frequently require United States ground forces to engage and destroy the enemy at ranges beyond 300 meters. These operations occur in rugged terrain and in situations where traditional supporting fires are limited due to range or risk of collateral damage. With these limitations, the infantry in Afghanistan require a precise, lethal fire capability that exists only in a properly trained and equipped infantryman. While the infantryman is ideally

suited for combat in Afghanistan, his current weapons, doctrine, and marksmanship training do not provide a precise, lethal fire capability to 500 meters and are therefore inappropriate. Comments from returning non-commissioned officers and officers reveal that about fifty percent of engagements occur past 300 meters. The enemy tactics are to engage United States forces from high ground with medium and heavy weapons, often including mortars, knowing that we are restricted by our equipment limitations and the inability of our overburdened soldiers to maneuver at elevations exceeding 6000 feet. Current equipment, training, and doctrine are optimized for engagements under 300 meters and on level terrain There are several ways to extend the lethality of the infantry. A more effective 5.56-mm bullet can be designed which provides enhanced terminal performance out to 500 meters. A better option to increase incapacitation is to adopt a larger caliber cartridge, which will function using components of the M16/M4. The 2006 study by the Joint Service Wound Ballistics-Integrated Product Team discovered that the ideal caliber seems to be between 6.5 and 7-mm. This was also the general conclusion of all military ballistics studies since the end of World War I.

The U.S. military does not believe its soldiers, sailors, airmen, and marines should be engaged in combat with adversaries on a "level playing field." Our combat individuals enter engagements to win. To that end, the United States has used its technical prowess and industrial capability to develop decisive weapons that overmatch those of potential enemies. In its current engagement-what has been identified as an "era of persistent conflict"- the nation's most important weapon is the dismounted soldier operating in small units. Today's soldier must be prepared to contend with both regular and irregular adversaries. Results in Iraq and Afghanistan show that, while the U.S. soldier is a formidable fighter, the contemporary suite of equipment and support does not afford the same high degree of overmatch capability exhibited by large weapons platforms-yet it is the soldier who ultimately will play the decisive role in restoring stability. Making the Soldier Decisive on Future Battlefields establishes the technical requirements for overmatch capability for dismounted soldiers operating individually or in small units. It prescribes technological and organizational capabilities needed to make the dismounted soldier a decisive weapon in a changing, uncertain, and complex future environment and provides the Army with 15 recommendations on how to focus its efforts to enable the soldier and tactical small unit (TSU) to achieve overmatch.

This book initiates with the story of the evolution of firearms to enable the reader to appreciate the sequence of the development of firearms. It discusses different classes of small arms, their mechanics, internal and external ballistics. Further, it covers the design idea of barrels and actions, various operating principles and relevant discussion on ammunition and propellants. The principle of quality in the design of the small arms is also elaborated in the desired degree. The book brings out the relevance of modern manufacturing technologies like MIM and

various surface treatments, and polymers for enhancement of product quality. To appreciate the sophistication of the architecture, the book presents the anatomical details of a few small arms of reputes. Provides complete understanding of overall small weapon systems Explores mechanics and physics of small arms Discusses proper design, quality control, and manufacturing process selections for a good weapon Covers common type of weapon failures and catastrophic failure Includes relevance of manufacturing processes The book is aimed at professionals and graduate students in Mechanical Design, Armament Design, Gun Design including personnel in the military, paramilitary, police, and all other armed forces and their maintenance crews.

This book examines Western military technological innovation through the lens of developments in small arms during the twentieth century. These weapons have existed for centuries, appear to have matured only incrementally and might seem unlikely technologies for investigating the trajectory of military-technical change. Their relative simplicity, however, makes it easy to use them to map patterns of innovation within the military-industrial complex. Advanced technologies may have captured the military imagination, offering the possibility of clean and decisive outcomes, but it is the low technologies of the infantryman that can help us develop an appreciation for the dynamics of military-technical change. Tracing the path of innovation from battlefield to back office, and from industry to alliance partner, Ford develops insights into the way that small arms are socially constructed. He thereby exposes the mechanics of power across the military-industrial complex. This in turn reveals that shifting power relations between soldiers and scientists, bureaucrats and engineers, have allowed the private sector to exploit infantry status anxiety and shape soldier weapon preferences. Ford's analysis allows us to draw wider conclusions about how military innovation works and what social factors frame Western military purchasing policy, from small arms to more sophisticated and expensive weapons.

Modern Combat Pistols provides a comprehensive account of the development of military and police semi-automatic pistols and their ammunition from 1945 to present day. It follows on from the same authors critically acclaimed Assault Rifle [Crowood 2004]. The first part of the book looks at defensive and offensive pistols, the difference between military and police pistols, and special-purpose weapons such as silenced and underwater pistols. The history of the handgun before 1945 is described, and there is an examination both of the development of the semi-automatic pistol since 1945 and of future trends in pistol design. The second part of the book is divided up on a country-by-country basis. Each countrys section starts with a historical overview of pistol development in that country before giving a description and technical data for each individual weapon. Appendices cover technical aspects of semi-automatic and ammunition design.

Like many other nations, the United States was born of war. The freedom sought by our founding fathers was not free; it was paid in patriot blood during the American Revolution. No matter the reason-the preservation of democracy, liberation of the oppressed, or revolution-the United States has been no stranger to the battlefield.

Through deserts, jungles, and grassy plains; in brick buildings, straw huts, and log cabins; by mountains, ditches, and the oceans, the infantry soldier has relied on one key tool to accomplish the mission: his weapon. Indeed, among the many characteristics of war, the infantry rifle has remained a critical battle component throughout time. The purpose of this study is to provide an analysis of the U.S. military's usage of various small arms and their associated cartridges from WWII to current day. The primary objective centers on an analysis of the driving factors and decisions used in military cartridge selection and development. The expected product will be a reference document to aid in the decision-making process for future small arms cartridge/weapon selection and development. Chapter I: This chapter provides general information, objectives, scope, methodology, benefits, and the organization of the study. Chapter II: This chapter establishes a baseline of terms used in this study. This chapter provides a brief technical background of projectiles, cartridges, and U.S. small arms types. The terms and concepts in this chapter are also used in the analysis portions of subsequent chapters. Chapter III: This chapter is separated into three sections and briefly describes the history of the U.S. Service Rifle from WWII to Afghanistan. The first discusses infantry weapons and ammunition during the Second World War as well as during the Korean War. The first segment focuses on the impact made by the M1 rifle. The second segment discusses infantry weapons and ammunition during the Vietnam War. The second segment focuses on the impact made by the M16 and M14 rifles. The third segment discusses infantry weapons and ammunition during the Persian Gulf War and the war in Afghanistan. The third segment focuses on the impact made by the M4 carbine. Chapter IV: This chapter will compare and contrast the Infantry weapon/cartridge capabilities against the actual battlefield requirements during the time periods discussed in Chapter III. The comprehensive analysis seeks to reveal whether or not the U.S. Army has provided its infantry with the optimum cartridge and weapon throughout history. Chapter V: This chapter provides an opportunity to draw conclusions and afford options for improved decision making during the U.S. Army's evolution of the infantry weapon and ammunition programs. CHAPTER I - INTRODUCTION * A. GENERAL INFORMATION * B. OBJECTIVE * C. SCOPE * D. METHODOLOGY (COMPARATIVE ANALYSIS) * E. BENEFITS OF THE STUDY * F. ORGANIZATION OF THE STUDY * CHAPTER II - AMMUNITION AND SMALL ARMS WEAPONS * A. AMMUNITION * B. U.S. SMALL ARMS WEAPONS * C. DISCUSSION * CHAPTER III - INFANTRY RIFLES ON THE BATTLEFIELDS * A. EUROPE AND THE GARAND * 1. Background * 2. Discussion. * B. SOUTHEAST ASIA, THE M14, AND THE M16 * 1. Background * 2. Discussion * C. THE PERSIAN GULF, AFGHANISTAN, AND THE M4 * 1. Background * 2. Discussion. * CHAPTER IV - ANALYSIS * A. EUROPE * 1. Weapon Type and Design * 2. Ammunition Caliber and Design * 3. System Performance * B. SOUTHEAST ASIA * 1. Weapon Type and Design * 2. Ammunition Caliber and Design * 3. System Performance * C. THE PERSIAN GULF AND AFGHANISTAN * 1. Weapon Type and Design * 2. Ammunition Caliber and Design * 3. System Performance * CHAPTER V - CONCLUSION BACKGROUND: Lightweight Cartridge for Small Arms program at Picatinny -- Designing/developing stainless steel cartridge case -- For structural support inserting Al plug * Galvanic corrosion -- Dissimilar metals that are in electrical contact while immersed in a solution electrolyte * 3 main galvanic couples of concern. OBJECTIVE:

To investigate the galvanic interaction between the materials used in the new ammunition design under aggressive conditions to determine if there will be a corrosion issue in the future.