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MEDEVAC AND THE FUTURE

IS IT TIME TO CHANGE THE APPROACH?

by

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A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

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22 February 2018

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Biography

Colonel Thomas Barrett was commissioned in 1995 from the University of Alaska, Fairbanks ROTC program and has served in numerous command and staff positions in his Army career. He is a graduate of the Aviation Officer Basic Course, the Initial Entry Rotary Wing Course, the Aviation Officer Advanced Course, Combined Arms Service Staff School, the United States Army Command and General Staff College and the Advance Military Studies Program. He is qualified in the OH-58D Kiowa Warrior and the UH-60A/L/M Blackhawk and has over 2,400 flight hours.

Colonel Barrett has deployed multiple times in support of Operation Iraqi Freedom and Operation Enduring Freedom. He most recently served as the Director of Evaluation and Standardization for U.S. Army Aviation. He has previously served as an assistant operations officer, platoon leader, logistics officer, company commander, personnel officer, and operations officer in the 10th Mountain and 82nd Airborne Divisions. He also served as the future operations chief and planner for US Army Pacific's deployable Contingency Command Post, and commanded a general support aviation battalion. Colonel Barrett is currently assigned to the Air War College, Air University, at Maxwell AFB, AL.

Abstract

The U.S. Army is the only element of the Joint Force with dedicated crews and aircraft for the sole purpose of executing the MEDEVAC mission. It is currently the policy that intra - theater aircraft flown by the U.S. Army will be marked as medical assets in accordance with the Geneva Convention, specifically Article 36 of the First Geneva Convention. This mission has only been executed under the umbrella of air superiority; future wars may not afford the United States this capability. As such it is time to relook the assumption that MEDEVAC aircraft should be marked in accordance with the Geneva Conventions.

Conflicts of the future are going to be extremely lethal and ones the United States military has not seen since World War II. Future conflicts will not have the luxury of positioning and using MEDEVAC as they are in today's conflicts. Now is the time to look at innovation in both thinking and capabilities to meet the requirements of the future. A change in thinking on this topic requires analysis and understanding the Geneva Conventions, future battlefields, the potential effects of this change, other options available, followed by a discussion of perceptions. Future battlefields will require not only effective medical capability but also survivable platforms. Relooking the model will be a must, as the Army like the Air Force, will eventually have to face the challenge of aging platforms and limited resources including future aircraft. The complex more lethal battlefield of the future requires a challenge to the current assumption that MEDEVAC aircraft must be marked.

Introduction

> "Conditions of future wars will be extremely austere. Water, chow, ammo, fuel, maintenance and medical support will be all that we should plan for. Soldiers could expect to be surrounded all the time, so they will always need to be on the move if they hope to stay alive." [1]
>
> "There will be no clear front line, no secure supply lines, no big bases."[2]
>
> GEN Mark Milley, Army Chief of Staff

These comments by the Chief of Staff of the Army started to shape the current thinking about future battlefields. Conflicts of the future are going to be extremely lethal and ones the U.S. military has not seen since World War II.[3] Medical assets have been able to move freely about the battlefield and quickly evacuate casualties.[4] Future conflicts will not have this luxury and now is the time to look at innovation in both thinking and capabilities. Success in future environments will require originality and new ways of thinking regarding the evacuation of casualties. Innovation will be critical to success and mission accomplishment in future fights. Routinely recognized in defense documents and papers, "innovation is paramount to the complex warfighting environment."[5]

Department of Defense (DoD) Directive 5100.1 assigns responsibility of intra-theater aeromedical evacuation to the U.S. Army.[6] It is U.S. Army doctrine and policy to mark aircraft in accordance with Article 36 of the Geneva Convention, insuring crews and aircraft operate under a protected status. Per regulation this marking cannot be removed, painted over, or obscured. [7] It is in this context this paper questions marking of aerial medical evacuation (MEDEVAC) [8] rotary wing assets. Is the current constraint of marking aircraft for the sole purpose of MEDEVAC limiting innovation and potentially more importantly DoD capability? There is and will always be a requirement to evacuate wounded from the battlefield, but should the U.S. Army continue to mark MEDEVAC aircraft to meet this requirement? It is time to

reconsider the current approach and look for innovative solutions to better support service members in future wars.

Does marking aircraft with a red cross prevent development of a better way to execute tactical aerial MEDEVAC? Troops operating in denied environments with no clear lines or big bases, as described by today's leaders, depend on MEDEVAC. How can the U.S. Joint Force best provide the enabler troops require, and the public demands in complex environments of the future is a question that must be answered.

As the military looks to the future and more toward major combat operations against near-peer competitors, it is time to reconsider key policy and operational assumptions associated with MEDEVAC. Should the DoD and U.S. Army remove the red crosses from MEDEVAC platforms and give up the protections specifically for the aircraft? The U.S. Air Force removed red crosses from its C-9 aircraft and moved to a platform agnostic model. Now C-130s, C-17s and other aircraft are used for medical evacuation without display of a red cross.[9] In this model, it is the medical crew and systems which are moved and configured to meet mission requirements.

The U.S. Air Force retired its active-duty C-9 aerial evacuation aircraft in 2005.[10] Now a variety of opportune aircraft with dedicated crews and equipment are used for the Aerial Evacuation mission.[11] This platform agnostic model is composed of medical crews and equipment that can move between platforms. It is different from the U.S. Army's model of dedicated platforms, crews and equipment. The U.S. Air Force model has the possibility to provide more flexibility and capability to the mission in future conflicts. The U.S. Army and larger DOD should more closely evaluate this model for use and adoption to meet future mission requirements. If the goal of the medical system is to provide the best and most responsive

medical care it may be time to combine new ways of thinking with other models and capabilities. The models used by the U.S. Air Force combined with capabilities such as Special Operations capabilities like the U.S. Air Force Special Operations Surgical Teams, and the United Kingdom's Medical Evacuation Response Team (MERT), could be the future of MEDEVAC.

Some of these recommendations are not new but, should be reassessed under the context of unmarked MEDEVAC aircraft. The U.S. Air Force changed its model for intra-theater aerial evacuation aircraft in 2001; it is time for the U.S. Army to look at the possibility of doing the same. Future battlefields will require not only effective medical capability but also survivable platforms.[12] Additionally, the U.S. Army like the U.S. Air Force, will eventually have to face the challenge of aging platforms and limited resources.

Flexibility and capability to meet operational requirements in conflicts of the future must be at the forefront of the discussion and research. "MEDEVAC platforms must present a capability to the commander founded on scalable forward care capable of operating in asymmetric future battlefields."[13] Recognizing removing the markings opens up the aircraft to be armed, a potential positive benefit, the arming of aircraft should not be driving the discussion. The focus must be capability and capacity to best operate in a complex future conflict within the intent of the law.

Thinking through the potential changes in policy necessitates a review of a few topics. These include Aerial Evacuation, the Geneva Conventions its Additional Protocols and commentary followed by a discussion of future battlefields, the potential effects of this change, other options available, and a brief discussion of perceptions and implications.

Aerial Evacuation

MEDEVAC and aerial evacuation generally is one component of the total military health system. The military health system, specifically, the integrated medical evacuation system, combined with the further development of Tactical Combat Casualty Care, has created a synchronized model of care and patient evacuation. Over time the system has proven its effectiveness. The recent wars in Iraq and Afghanistan have proved the success of the system. It is responsible for an unprecedented survival rate of 98% of casualties in today's conflicts.[14] It is not the intent of this paper to challenge the overall system itself, only one piece of the system.

This paper only questions the requirement to move casualties on specially marked aircraft as a matter of policy and doctrine. The military health system has successfully used other unmarked aircraft to evacuate patients in Afghanistan and Iraq. Patients have been evacuated from points of injury using all U.S. services and coalition aircraft within the tactical evacuation system. Due to high demands of multiple conflicts and their dispersed nature, other services and coalition aircraft augment the U.S. Army in the execution of the MEDEVAC mission. U.S. Air Force Rescue Squadron aircraft, and British, German, Norwegian, and Spanish coalition aircraft have all supported and performed MEDEVAC in Afghanistan.[15] MEDEVAC aircraft in Iraq also were augmented by Navy HH-60s to meet mission requirements.[16] In Afghanistan, U.S. Air Force and coalition aircraft routinely flew unmarked MEDEVAC missions.[17] Their success is evidence the system works with virtually any type aircraft regardless of markings.

The DoD assigned the U.S. Army responsibility for aerial MEDEVAC, specifically intra-theater aeromedical evacuation in a defined theater.[18] In completing this mission, the U.S. Army specifically marks aircraft, trains crews, and equips aircraft for MEDEVAC, and is the only service to do so.[19] There are three types of enroute care defined by U.S. Joint Doctrine. "Casualty

evacuation (CASEVAC) is the unregulated movement of casualties. MEDEVAC is the regulated movement of casualties in predesigned transportation. Aeromedical Evacuation (AE) is the U.S. Air Force system of moving regulated patients between medical treatment facilities."[20] The U.S. Army is the primary provider of intra-theater aerial evacuation for the U.S. Joint Force.[21]

The crews and aircraft, which comprise the U.S. Army MEDEVAC, have created an exceptional model of caring for and movement of wounded on the battlefield to the next higher levels of care. The use of helicopters in the aeromedical evacuation system has a history going back to the Korean War when the U.S. Army pioneered the use of helicopters to evacuate wounded off the battlefield.[22] However, it wasn't until 1962, during Vietnam, the U.S. Army began using aircraft marked with the red cross for this mission.[23]

U.S. Army MEDEVAC aircraft are purpose-built for the MEDEVAC mission.[24] Not only are aircraft marked, but are designated, equipped and staffed with medical personnel. This is a key distinction from other services. It remains essentially unchanged from what was used in Vietnam.[25] This concept becomes a key stake for the medical community; it is not necessarily about the marking of the aircraft but design and allocation of specially identified and organized aircraft specifically for MEDEVAC.

Modeling for Afghanistan showed demand for over 97 MEDEVAC aircraft to meet the "Golden Hour" standard.[26] The "Golden Hour" is the requirement established to evacuate a casualty to the next higher level of care with in one hour for an urgent or urging surgical mission.[27] Secretary Gates declared it the U.S. military standard in 2009.[28] The pressure to use aircraft for other than MEDEVAC missions has existed since Vietnam.[29] It is also one of the main reasons the U.S. Army continues to mark aircraft today.[30] According to the Army, the

aircraft are marked to ensure specific allocation and use for this mission, "the aircraft and crew are marked for no other mission."[31]

Too often the history and culture of organizations limits new and distinct ways of thinking. Processes and thinking stuck in past models limits opportunities to enact change to meet the future. Admittedly, a risk of removing the markings opens from dedicated MEDEVAC aircraft is it could open the aircraft up for other missions. Without red crosses and the inferred designation, aircaft could potentially be used for any mission with MEDEVAC becoming a secondary role. This was the fear in Vietnam. A concept was developed to use portable red crosses for the MEDEVAC mission but regulary use the aircraft for other missions.[32] It is not the intent behind this question to create "multi-role" aircraft and allocate aircraft to the MEDEVAC mission when required or as a secondary mission. The allocation of aircraft for the mission would be set. There should always be dedicated aircraft for this mission, just not marked aircraft. Allocation of aircraft for this specific mission could be accomplished through tasking and operational orders. These orders would establish the requirement of units to maintain a capability to perform the MEDEVAC mission no different that the current allocation. Additionally, U.S. Army units have a Mission Essential Task List (METL). This list of required tasks would ensure crews could still be highly trained on mission requirements and equipment ensuring they are capable to support the mission. While not a complete or the sole solution, these two points highlight ways to mitigate risks associated with this change in thinking.

It is time for the U.S. Army to consider alternatives to the current MEDEVAC model of marking aircraft. Other alternatives and capabilities must be evaluated against the enduring and critical requirement to evacuate wounded from the battlefield. Even today, unmarked aircraft perform this mission and do not suffer from mission creep or are used for other missions. Mixes

of marked and unmarked, but allocated aircraft, in Afghanistan still support the current system.[33] This is a critical mission and one that the nation, troops, and leaders expect to be a part of our military planning and operations. The requirement to care for Soldiers, Sailors, Airmen, Marines and our coalition partners is a sacred one. Challenges to an effective and proven system should not be taken lightly. It is the future and its challenges our troops face which require a new approach to thinking about the employment of MEDEVAC resources. To continue moving forward with a potential change, analysis must continue with an understanding of the Geneva Conventions, its rules and impacts on medical evacuation. Overcoming the history and passion associated with MEDEVAC begins here.

Geneva Conventions, Additional Protocols, and Commentaries

It is currently the policy that intra-theater aircraft flown by the U.S. Army for MEDEVAC will be marked as medical assets in accordance with the Geneva Convention, specifically Article 36 of the First Geneva Convention (GCI). The U.S. Army marks MEDEVAC aircraft solely dedicated to this mission in accordance with the GCI.

> "Although the most recognized mission of MEDEVAC assets is the evacuation and provision of en route medical care to the wounded, the essential and vital functions of MEDEVAC resources encompass many additional missions and tasks that support the medical mission. MEDEVAC resources are used to transfer patients within the JOA (Joint Operations Area) and from MTFs (Medical Treatment Facilities) to patient staging elements; emergency movement of Class VIII, blood and blood products, medical personnel and equipment; and serve as messengers in medical channels."[34]

Marking aircraft in accordance with the Geneva Convention supports all of these missions and has been the standard since Vietnam.

Operating under these rules should provide the aircraft protected status. It should be noted, the status of the medical crewmembers does not change regardless of aircraft marking. In accordance with CGI medical personnel are protected.[35] The reality in recent wars has shown

something quite different for MEDEVAC. Aircraft properly displaying the red cross and flying at heights, times and along agreed upon routes are to be safe from deliberate targeting by the enemy. Although according to the U.S. Army no deliberate attempt has been made to target MEDEVAC aircraft specifically,[36] historically and in the current conflicts, MEDEVAC aircraft are routinely shot.

Even as far back as Vietnam, it was recognized the enemy has not always followed the protection afforded by the Geneva Conventions.[37] In Vietnam, MEDEVAC aircraft and their crews experienced 3.3 times higher casualty rates compared to other helicopter missions.[38] MEDEVAC aircraft operating in Afghanistan from one unit in one operation over a period of six months were shot at 57 times.[39] Most recently, in Syria, a MEDEVAC aircraft returned with not only the casualty but also numerous bullet holes.[40] It is clear in both history and current conflicts the protection of the Geneva Convention does not matter to the enemy. The U.S. Army evacuation aircraft used in Iraq and Afghanistan are marked and unarmed. Two other aircraft are flown in support of this mission, but fly as CASEVAC[41] platforms, not MEDEVAC. The U.S. Air Force "PEDRO" Pavehawk, a modified Air Force version of the U.S. Army's Blackhawk, and the UK Royal AF Medical Evacuation Response Team (MERT), a CH-47, are tasked and allocated for the CASEVAC mission in Afghanistan. Both the MERT and PEDRO are unmarked and armed with mini-guns in addition to carrying trained medical personnel.[42]

Although the U.S. is dedicated to abiding by the GC and therfore afforded protection, the reality of execution by the U.S. is slightly different. The U.S. has not operated aircraft under the complete letter of the law with respect the specifics outlined in GCI Article 36.[43] There are three parts of Article 36 present a challenge to compliance. First, aircraft performing the medical evacuation mission are protected while flying at heights, times and on routes specifically agreed

upon between the belligerents concerned. Second, unless agreed otherwise; flights over enemy or enemy-occupied territory are prohibited. Third, medical aircraft shall obey every summons to land. In the event of a landing thus imposed, the aircraft with its occupants may continue its flight after examination, if any.[44] Operating under air superiority and in ambiguous conflicts has complicated the expectations of MEDEVAC and blurred the operational capacity to follow the requirements.

The environments operational forces have fought in have shaped operations under this construct. Since the employment of MEDEVAC in Korea, through Vietnam, and today, the force has operated under the umbrella of air superiority. In future environments, MEDEVAC may not operate or be in a position to operate under this protection. This unknown future presents a potential challenge to meet the Geneva Convention requirements as currently applied by U.S. forces. The intent behind marking the aircraft is to operate MEDEVAC in accordance with the Geneva Convention Article 36 of GCI.

In every war since Vietnam, the U.S. has operated the MEDEVAC mission under air superiority. This environment has enabled U.S. forces to operate with impunity in the land and air domain. This freedom has permitted and supported the current model of MEDEVAC without questioning the need for specially marked and dedicated aircraft or requiring the U.S. to completely comply with Article 36 of the Geneva Convention. Operating under air superiority has allowed the United States to operate its MEDEVAC without question by other parties or the international community in conflicts. In the future, this may not be the case and potentially presents a dilemma for the United States and the military.

GCI, Article 36 states aircraft must be marked with a distinctive emblem per Article 38. CGI, Article 38 describes the authorized emblems, to include a red cross on white background.[45]

Article 36 outlines the detailed requirements for medical aircraft and establishes the legal basis for their protection. It asserts "aircraft exclusively employed for the removal of wounded and sick and for the transport of medical personnel and equipment, shall not be attacked, but shall be respected by the belligerents, while flying at heights, times and on routes specifically agreed upon between the belligerents concerned, and that unless agreed otherwise, flight over enemy or enemy occupied territory are prohibited."[46] Additionally the article states, medical aircraft shall obey every summons to land for examination.[47] U.S. Army and Joint Doctrine recognize the importance of the article and highlight it throughout doctrine.[48] It is in these contexts the U.S. MEDEVAC aircraft operate outside the exact letter of Article 36. Operating outside doctrine is recognized in doctrine. U.S. Army doctrine states if there is no agreement on routes, altitudes and times, belligerents use medical aircraft at their own risk and peril.[49]

With the context of air superiority in counterinsurgency, stability and limited combat operations MEDEVAC aircraft fly directly to points of injury on direct routes. There is no established, shared or published routing for MEDEVAC aircraft. It is also a generous assumption that a pilot on a mission would land for inspection. A more realistic assumption is that no pilot would land his or her aircraft at the request of a belligerent for the sole purpose of inspection. In fact, this requirement is directly contradicted by the policy of the U.S. to evacuate casualties to the next higher level of care within one hour.[50]

This aspect of the application of the Geneva Convention must be given more analysis. The reality of current and past conflicts has enabled the U.S. to avoid dealing with this issue. If held accountable to this article there would be significant implications for the crews themselves, the rules of engagement, and the escorts that accompany MEDEVAC. As the U.S. Army has focused on the protections afforded by Article 36 with marking aircraft, many of the secondary

and third order effects appear to be overlooked and the implications of selectively following the rules must be reviewed and analyzed. Further understanding may be gained by looking at the published commentary on the Articles and intent behind them.

"The Commentaries provide a historical perspective and highlight steps in the development of the law and serve as respected and essential interoperations of the Geneva Conventions."[51] It was understood that the ability to engage aircraft beyond the visual range would necessitate the sharing of routes. The commentary accounted for the changing technology used to fight wars, in particular, air defense weapons that could engage beyond sight.[52] The result was strict criteria to ensure the protection of medical personnel and assets when executing this mission.[53] Despite the understanding that technology was changing and would impact future wars, the Articles and the subsequent commentary do not account for the significant advances in technology on the battlefield. These changes include Cyber, Electronic Warfare, the integrated air defense systems employed by modern nations, or even the electronic marking of aircraft know as identification friend or foe (IFF). The commentary of 1952 also recognized flexibility in roles and missions.[54]

> "Accordingly, belligerents may use aircraft in multiple roles, for example sending transport aircraft to the front line carrying munitions and soldiers and, after unloading that cargo, transporting the wounded and sick or medical personnel and equipment away from the front. In the former case, the aircraft is not entitled to protection, nor to display the distinctive emblem; in the latter case, the aircraft will be entitled to all due protections and to display the distinctive emblem, so long as other articles of the Convention are complied with."[55]

The First Convention, Additional Protocol I and the commentary associated with each provide a great deal of flexibility as to which type of aircraft can qualify as medical aircraft and when. Additional Protocol I, specifically Articles 24-31 provides updated and more detailed

descriptions on medical aircraft and their use. Of note, the U.S. is not a signatory party to Additional Protocol I.

There is no requirement to organize specifically for this mission to meet the intent of the Geneva Convention Articles, although this is exactly what the U.S. Army does. The Geneva Convention does not limit the use of the aircraft for other missions but only their use when marked for a specific mission, in this case MEDEVAC. If the Articles provide significant flexibility toward the execution of this mission, what then holds the U.S. Army to continue to mark aircraft with a red cross for this mission?

Perhaps it is not the Geneva Convention Articles, which limit the U.S., but its own practice and perception. The articles provide significant flexibility for nations to operate MEDEVAC. Despite the flexibility afforded by these rules, future conflicts present a potential challenge for the U.S. to comply with the rules that are held so close in both doctrine and practice. There is a perceived legal and moral obligation to mark aircraft that has evolved over 57 years of use.[56] This customary use and obligation perceived by the military has shaped doctrine and MEDEVAC execution. Fifty-seven years of history have created a significant customary internal obligation for the U.S. with regard to MEDEVAC.[57] The perception of trust created by this dynamic is at the core of this issue.[58] It becomes critical for the U.S. to lead the world, uphold the rules and set the example. It becomes an important part of the profession to maintain and hold the moral high ground.[59] Changing this dynamic and perception represents a significant hurdle, but understanding the details of the Geneva Convention Articles and thinking by the U.S. Army helps to start the process.

The Future, Doctrine, and Options

Large-scale combat operations of the future will be different from the recent wars fought by the U.S. Operations will be conducted beyond the "Golden Hour" and could generate massive casualties. Troops will likely have to become accustomed to waiting longer for evacuation. The capability to move medical assets where and when they are needed may not be the case in future conflicts.[60] Adversaries of the future, unlike those we have faced with the wars in Iraq and Afghanistan or even as far back as Vietnam will challenge the forward movement and positioning of MEDEVAC. Considerations of enemy air defenses, enemy locations, and other effects will all challenge the ability to execute MEDEVAC.[61] The recent war in Ukraine demonstrated the lethality of the future battlefield. In four minutes of artillery fire, battalion-sized units were virtually destroyed with casualties overwhelming medical units and facilities.[62]

As the military grapples with these challenges of the future, there are gaps in the current capabilities. These gaps include aircraft capabilities, the number of assets available for the mission and standard of care to highlight a few. Both U.S. Army and U.S. Joint Doctrine acknowledge other methods of patient evacuation including the use of specially trained medical teams by U.S. Air Force Special Operations Forces (SOF) on board U.S. Army Special Operations Aircraft to evacuate casualties from austere locations far outside the reach of conventional support.[63] These Special Operations Surgical Teams provide a robust example of a potential capability that could be modeled in a limited fashion to provide better flexibility to tactical aerial evacuation. Another recognized gap is the weather that limited the launching U.S. Army MEDEVAC aircraft. In particular, U.S. Air Force PEDRO aircraft were used when weather prevents the launch of U.S. Army MEDEVAC aircraft.[64] PEDRO and other capabilities have been used extensively in recent wars and to successful end states.

In studies, these other platforms and capabilities are even recognized as more superior to U.S. Army MEDEVAC.[65] In 2011 the Defense Health Board Committee on Tactical Combat Casualty Care had several key recommendations to improve care and standardization. These included using the most capable platform available (CH-47/CH-53/CV-22), consider the use of armed, armored aircraft, and to consider modular packages for deployment on tactical aircraft.[66]

The Defense Health Board recommended changes and improvements in Tactical Combat Casualty Care, including aeromedical evacuation. This study identified the need for a new capability based on identified gaps in the current tactical aerial medical evacuation construct. The study developed and approved recommendations for improvements to the current care procedures across the services. It was recognized that MEDEVAC is often not permitted to deploy to hostile locations and delays would occur when it was the only available platform in a combat zone.[67] The study recognized the British MERT (Medical Emergency Response Team) was one of the preferred assets in the Afghanistan theatre. Additionally, this decision provided an armed capability.[68] Despite this "armed capability" the MERT still required escorts when flying into hostile areas. In Afghanistan, the MERT has been held from landing because of the situation on the ground.[69] This is the same for any MEDEVAC aircraft attempting to land in a hot combat zone. The risk from enemy fire to any aircraft in combat is high, so while there will always be a component of self-protection to any aircraft landing, it should not be the overriding assumption on this decision, but perhaps just a part to the larger puzzle of how best to provide MEDEVAC in a future environment.

Although in these examples, the U.K. MERT and the U.S. Air Force PEDRO are both armed, that is not the overriding issue. Neither is marked. The challenge is getting to the injured or wounded service member with capability and capacity. Capability includes flying in

demanding weather conditions of low visibility, high altitudes, dusty and brown out landing zones to name a few challenges aircrew face when executing this mission. Capacity is the ability to care for one or multiple critically injured patients. Arming or not arming the aircraft is only one component of the argument, by marking the aircraft, the challenge in future wars will be adapting to meet the "Golden Hour" requirement with a defined asset.

Per the study, TACEVAC includes both MEDEVAC and CASEVAC assets. The study recommended utilizing the most capable platform, a CH-53, CV-22 or CH-47 in the development of future models.[70] Absent from this list was the HH-60 MEDEVAC aircraft and highlighted was the recognition that the U.S. needs to develop an advanced care capability. A few of other existing capabilities could be further developed. Specifically the Special Operations Surgical Team could be combined with other platforms in the U.S. Army, such as the CH-47 or the Future Vertical Lift once complete. These would provide a MERT like capability that could serve as the core of the U.S. Army MEDEVAC. A team such as this has the potential to provide commanders and troops a potentially more responsive and capable asset. By narrowly defining the current MEDEVAC capability with a specific aircraft and marking it for medical evacuation constrains the flexibility of commanders to adjust systems to meet requirements and the complexity of future wars.

The Army further recognizes gaps in the DoD directive assigning authority to the Army with regards to better being able to accomplish this mission, "A DoDI describing 'how' the Army to execute intra-theater AE per DoDD 5100.01 would better posture the force for AE operations during future conflict."[71] Even the medical community seems to recognize the gaps in the requirement. Why did we need to have augmentation in Afghanistan – there was a 97 aircraft requirement for intra-theater evacuation.[72] The existing capability did not exist within the U.S.

Army in 2012. In order to meet the mission requirements in Afghanistan, the U.S. Army required augmentation by the U.S. Air Force Pedro rescue crews, British MERT, and a mix of NATO forces. The reality is that there was not even enough total rotary wing aircraft in Afghanistan to meet all the mission demands and expectations of troops and the public.

Afghanistan is recognized as a helicopter war where demands for aircraft routinely exceed availability. The reality of asset constraints in a high demand environment strikes at the core of the argument for marking aircraft by the U.S. Army. This critical asset must be marked and allocated specifically for this mission. It is a DoD, and specifically a U.S. Army medical community, limitation and a fear that aircraft will be used for other purposes that seems to drive the use of marking aircraft with a red cross. This way of thinking is reinforced by public statements made by the U.S. Army such as, "while consistent with the Geneva Conventions, it also ensures aircraft use for no other missions; this is critical in austere locations where aircraft are in high demand".[73]

Flexibility must be built into the system in multiple places and points. How and where to leverage this flexibility is at the core of the matter. The U.S. Joint Trauma System addresses casualty movements. It focuses primarily on the movement of casualties from the point of injury. "The platform selected / used is dependent on the patient acuity, threat, mission requirements and location of sending and receiving facilities."[74] "Rotary wing platform will vary according to casualty and mission requirements."[75] The reality is this is generally not the case. There is one model for MEDEVAC, and that is the U.S. Army MEDEVAC platform regardless of threat or other considerations. Despite the augmentation of MEDEVAC assets in recent conflicts by U.S. Air Force para rescue crews, Pedro, and the U.K. MERT, the default response was to use Army

MEDEVAC. The doctrine calls for flexibility, but there is none in the system with the current construct based on a marked aircraft designated solely for this purpose.

Conclusion and Recommendations

"Innovation will be required to fight and win on future battlefields and it requires us to shed anachronistic concepts that aircraft can only perform singular functions and missions."[76] If the Army is truly an agile joint and coalition partner, then it will need to relook thinking and its assumption regarding MEDEVAC in the future. The U.S. Army has developed and refined the ability to evacuate wounded from the battlefield through specially trained aircrews, specialized equipment, and organization. If the priority and success of tactical aeromedical evacuation is going to continue in future wars and conflicts, it is time to rethink the fundamental assumption that tactical MEDEVAC must be marked and flown in accordance with Geneva Convention Article 36.

Described in an article on Forward Aeromedical Evacuation, "platforms represent a capability that will provide flexibility to commander and optimize scalable care methods."[77] Operations in this future start with changing the fundamental assumption that MEDEVAC are marked and designated. Unmarked tactical aircraft with the right medical capability in support of the aeromedical evacuation mission are a must to fight in future conflicts. It is not about the aircraft, but about the medical personnel and systems in the back that have always made the difference and will continue to make the difference in the future.

It is time to broaden the way of thinking about the assumptions about the employment of aeromedical evacuation assets. "We come from a society of improvisers, a society of innovators, tinkerers, problem-solvers, techno-savvy at early age, and independence of action comes naturally to all Americans."[78] It is time innovate thinking and change assumptions about

MEDEVAC. While no force does better than the U.S. Army in MEDEVAC, the force cannot rest on past success or models.[79] With the responsibility for this capability placed on the U.S. Army by the DOD it is time to look forward and change thinking about MEDEVAC. The U.S. Army should leave behind the notion MEDEVAC aircraft are required be marked with a red cross. The U.S. Army must combine capability from the U.S. Joint Force and its allied partners with a new approach to improve this critical mission requirement. It is time to untether medical evacuation from an outdated concept that has the potential to be ineffective on the battlefields and wars of the future.

Notes

[1] "Army $40B Short On Modernization Vs. Russia, China: CSA Milley," *Breaking Defense*, accessed

[2] "Miserable, Disobedient & Victorious: Gen. Milley's Future US Soldier," *Breaking Defense*, accessed January 22, 2018, https://breakingdefense.com/2016/10/miserable-disobedient-victorious-gen-milleys-future-us-soldier/.

[3] "Army $40B Short On Modernization Vs. Russia, China: CSA Milley," *Breaking Defense*, accessed January 22, 2018, https://breakingdefense.com/2016/10/army-40b-short-on-modernization-vs-russia-china-csa-milley/.

[4] Shawn Snow, "No Guaranteed 'Golden Hour' for Marines Headed into the next Big Fight," *Marine Corps Times*, February 15, 2018, https://www.marinecorpstimes.com/news/your-marine-corps/2018/02/15/no-golden-hour-for-marines-headed-into-the-next-big-fight/.

[5] "Quadrennial Defense Review 2014," n.d., 1.

[6] "DOD 5100.01 Functions of the Department of Defense and Its Major Components," 30, accessed January 8, 2018, https://fas.org/irp/doddir/dod/d5100_01.pdf.

[7] "AR 40-3 Medical, Dental, and Veterinary Care" (Headquarters, Department of the Army, April 23, 2013), 58.

[8] "Joint Publication 4-02 Health Service Support" (Department of Defense, July 26, 2012), 1. (Medical evacuation (MEDEVAC) traditionally refers to USA, USN, USMC, and USCG patient movement using predestinated tactical or logistic aircraft (both fixed-wing and rotary-wing), boats, ships, and other watercraft temporarily equipped and staffed with medical attendants for en route care)

[9] "Air Force Retiring Nightingale Fleet," *Stars and Stripes*, accessed April 8, 2018, https://www.stripes.com/news/air-force-retiring-nightingale-fleet-1.10267.

[10] "Historic C-9 Heads to Andrews for Retirement," *U.S. Air Force*, accessed February 5, 2018, http://www.af.mil/News/Article-Display/Article/133275/historic-c-9-heads-to-andrews-for-retirement/.

[11] Jeffrey COL Bailey et al., eds., "Joint Trauma System" (U.S. Department of Defense, U.S. Army Institute for Surgical Research, n.d.), 25.

[12] Chris M. Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 136, accessed August 9, 2017, http://www.dtic.mil/docs/citations/ADA614622.

[13] Chris M. Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 136, accessed August 9, 2017, http://www.dtic.mil/docs/citations/ADA614622.

[14] Samuel W. Sauer et al., "Saving Lives on the Battlefield (Part II) - One Year Later A Joint Theater Trauma System and Joint Trauma System Review of Prehospital Trauma Care in Combined Joint Operations Area -

Afghanistan (CJOA-A) Final Report, 30 May 2014" (BSA Fort Sam Houston, TX 78234: United States Army Institute of Surgical Research, July 1, 2015), 25.

[15] "Army Aeromedical Evacuation Campaign Plan 2020" (Medical Evacuation Proponency Directorate, n.d.), 10, http://dustoff.org/Old-news/AECP2020.pdf.

[16] This story was written by LTJG Sam Mason Affairs 2515th Naval Air Ambulance Detachment Public, "New Navy Air Ambulance Company Provides MEDEVAC Support," accessed February 19, 2018, /submit/display.asp?story_id=23162.

[17] Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 133.

[18] "DOD 5100.01 Functions of the Department of Defense and Its Major Components," accessed January 8, 2018, https://fas.org/irp/doddir/dod/d5100_01.pdf.

[19] "Joint Publication 4-02 Health Service Support" (Department of Defense, July 26, 2012), 117.

[20] Ibid., 26.

[21] Ibid., 158.

[22] Chris M. Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 130, accessed August 9, 2017, http://www.dtic.mil/docs/citations/ADA614622.

[23] Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 310.

[24] "Army Statement on MEDEVAC Issue," *www.army.mil*, n.d., http://www.army.mil/article/72250/Army_statement_on_MEDEVAC_issue.

[25] Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 133.

[26] " Army Aeromedical Evacuation Campaign Plan 2020," 8.

[27] "AR 40-3 Medical, Dental, and Veterinary Care" (Headquarters, Department of the Army, April 23, 2013), 67.

[28] Robert Michael Gates, *Duty: Memoirs of a Secretary at War*, 2014, 422, http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=747184.

[29] Patrick Henry Brady and Meghan Brady Smith, *Dead Men Flying: Victory in Viet Nam : The Legend of Dust Off, America's Battlefield Angels* (New York: WND Books, 2012), 43, http://site.ebrary.com/id/10677371.

[30] "Army Statement on MEDEVAC Issue."

[31] Ibid.

[32] Patrick Henry Brady and Meghan Brady Smith, *Dead Men Flying: Victory in Viet Nam : The Legend of Dust Off, America's Battlefield Angels* (New York: WND Books, 2012), 43, http://site.ebrary.com/id/10677371.

[33] Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy."

[34] "Joint Publication 4-02 Health Service Support," 1.

[35] "Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field, 1949 - 24 - Protection of Permanent Personnel," accessed October 7, 2017, https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/ART/365-570030?OpenDocument.

[36] "Army Statement on MEDEVAC Issue."

[37] Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 132.

[38] Ibid.

[39] John Ryan and Tony Dokoupil On 11/5/12 at 1:00 AM, "DUSTOFF 73 and the 'Valley of Death,'" *Newsweek*, November 5, 2012, http://www.newsweek.com/afghanistans-valley-death-medevac-teams-miracle-rescue-63779.

[40] Thomas Barrett, "Medical Evacuation and Exception by the United States," October 9, 2017.

[41] "Joint Publication 4-02 Health Service Support," 117. CASEVAC, a term used by all Services, refers to the unregulated movement of casualties aboard ships, vehicles, or aircraft.

[42] Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 132.

[43] Article 36 of the Geneva Convention "1) Medical aircraft, that is to say, aircraft exclusively employed for the removal of wounded and sick and for the transport of medical personnel and equipment, shall not be

attacked, but shall be respected by the belligerents, while flying at heights, times and on routes specifically agreed upon between the belligerents concerned.

(2) They shall bear, clearly marked, the distinctive emblem prescribed in Article 38, together with their national colours, on their lower, upper and lateral surfaces. They shall be provided with any other markings or means of identification that may be agreed upon between the belligerents upon the outbreak or during the course of hostilities.

(3) Unless agreed otherwise, flights over enemy or enemy-occupied territory are prohibited.

(4) Medical aircraft shall obey every summons to land. In the event of a landing thus imposed, the aircraft with its occupants may continue its flight after examination, if any.

(5) In the event of an involuntary landing in enemy or enemy-occupied territory, the wounded and sick, as well as the crew of the aircraft shall be prisoners of war. The medical personnel shall be treated according to Article 24, and the Articles following."

[44] "Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field,1949 - 36 - Article 36 : Medical Aircraft - Commentary of 2016," accessed October 7, 2017, https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=8A6EF1B1ED907F49C1257F7A0056328A.

[45] "Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field,1949," accessed October 8, 2017, https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Treaty.xsp?documentId=4825657B0C7E6BF0C12563CD002D6B0B&action=openDocument.

[46] "Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field,1949 - 36 - Article 36 : Medical Aircraft - Commentary of 2016," accessed October 7, 2017, https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=8A6EF1B1ED907F49C1257F7A0056328A.

[47] "Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field,1949 - 36 - Article 36 : Medical Aircraft - Commentary of 2016."

[48] "Joint Publication 4-02 Health Service Support" (Department of Defense, July 26, 2012), 240.

[49] "FM 4-02 Army Health System" (Headquarters, Department of the Army, August 2013), 73.

[50] Ashley Welch CBS News September 30, 2015, and 2:00 Pm, "'Golden Hour' Policy Saved Hundreds of U.S. Troops," accessed September 23, 2017, https://www.cbsnews.com/news/golden-hour-policy-decreased-combat-deaths-among-u-s-troops/.

[51] Jean-Marie Henckaerts, "Bringing the Commentaries On the Geneva Conventions and Their Additional Protocols into the Twenty-First Century," *International Review of the Red Cross* 94, no. 888 (n.d.): 1553.

[52] "Treaties, States Parties, and Commentaries - Additional Protocol (I) to the Geneva Conventions, 1977 - 24 - Protection of Medical Aircraft - Commentary of 1987," accessed October 8, 2017, https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=F3856B604A78DFF1C12563CD0043178B.

[53] Ibid.

[54] "Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field,1949 - 36 - Article 36 : Medical Aircraft - Commentary of 2016."

[55] Ibid.

[56] Thomas Barrett, "Medical Evacuation and Exception by the United States," October 9, 2017, 7.

[57] Ibid.

[58] J. Ross Yastrzemsky, "To Arm or Not to Arm? An Examination of the U.S. Army's Aeromedical Evacuation Procedures Through a Professional Lens," *Aviation Digest* 2, no. 4 (December 2014): 37.

[59] Ibid., 42.

[60] Shawn Snow, "No Guaranteed 'Golden Hour' for Marines Headed into the next Big Fight," *Marine Corps Times*, February 15, 2018, https://www.marinecorpstimes.com/news/your-marine-corps/2018/02/15/no-golden-hour-for-marines-headed-into-the-next-big-fight/.

[61] "Army Sustainment: Medical Evacuation Planning in Support of the Brigade Combat Team," accessed February 19, 2018, http://www.almc.army.mil/alog/issues/JanFeb12/Medical_Evacuation.html.

[62] "FM 3-0 Operations" (Headquarters, Department of the Army, October 2017), 21.

[63] "Joint Publication 4-02 Health Service Support," 85.

[64] Chris M. Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 133, accessed August 9, 2017, http://www.dtic.mil/docs/citations/ADA614622.

[65] Nancy D. Dickey, Donald Jenkins, and Frank K. Butler, "Tactical Evacuation Care Improvements within the Department of Defense 2011-03," n.d.

[66] Ibid.

[67] Ibid., 2.

[68] Ibid., 3.

[69] ukforcesafghanistan, "Medical Emergency Response Team (MERT): 24 Hours in Pictures," *UK Forces Afghanistan*, June 3, 2011, https://ukforcesafghanistan.wordpress.com/2011/06/03/medical-emergency-response-team-mert-24-hours-in-pictures/.

[70] Dickey, Jenkins, and Butler, "Tactical Evacuation Care Improvements within the Department of Defense 2011-03," 7.

[71] " Army Aeromedical Evacuation Campaign Plan 2020" (Medical Evacuation Proponency Directorate, n.d.), 10, http://dustoff.org/Old-news/AECP2020.pdf.

[72] Ibid., 8.

[73] "Army Statement on MEDEVAC Issue," *www.army.mil*, n.d., http://www.army.mil/article/72250/Army_statement_on_MEDEVAC_issue.

[74] "U.S. Institute of Surgical Research - Joint Trauma System and DoD Trauma Registry," 25, accessed January 14, 2018, http://usaisr.amedd.army.mil/10_jts.html.

[75] Ibid.

[76] David A. LtGen (Ret) Deptula, "Beyond the 'Bomber'" (Mitchell Institute for Aerospace Studies, 2015), 7.

[77] Olson et al., "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy," 136.

[78] "Miserable, Disobedient & Victorious: Gen. Milley's Future US Soldier," *Breaking Defense*, accessed January 22, 2018, https://breakingdefense.com/2016/10/miserable-disobedient-victorious-gen-milleys-future-us-soldier/.

[79] USAACE Directorate of Training and Doctrine, "Aviation Digest," *Aviation Digest* 2, no. 4 (December 2014): 2.

Bibliography

Affairs, This story was written by LTJG Sam Mason, 2515th Naval Air Ambulance Detachment Public. "New Navy Air Ambulance Company Provides MEDEVAC Support." Accessed February 19, 2018. /submit/display.asp?story_id=23162.

"Air Force Instruction 41-301 World Wide Aeromedical Evacuation System," August 1, 1996. http://govdocs.rutgers.edu/mil/af/AFI41-301.pdf.

"Air Force Might Retire Costly, Aging C-9 Aircraft." *Stars and Stripes*. Accessed February 5, 2018. https://www.stripes.com/news/air-force-might-retire-costly-aging-c-9-aircraft-1.973.

"Air Force Retiring Nightingale Fleet." *Stars and Stripes*. Accessed April 8, 2018. https://www.stripes.com/news/air-force-retiring-nightingale-fleet-1.10267.

"Air Force Tactics, Techniques, and Procedures 3-42.5." Headquarters, United States Air Force, November 1, 2003. http://www.e-publishing.af.mil.

"Air Transportation Eligibility DOD 4515-13R." Office of the Under Secretary of Defense for Acquisition and Technology, November 3, 1994.

"AR 40-3 Medical, Dental, and Veterinary Care." Headquarters, Department of the Army, April 23, 2013.

"AR 95-1 Flight Regulations." Headquarters, Department of the Army, March 11, 2014.

"Army $40B Short On Modernization Vs. Russia, China: CSA Milley." *Breaking Defense*. Accessed January 22, 2018. https://breakingdefense.com/2016/10/army-40b-short-on-modernization-vs-russia-china-csa-milley/.

"Army Aeromedical Evacuation Campaign Plan 2020." Medical Evacuation Proponency Directorate, n.d. http://dustoff.org/Old-news/AECP2020.pdf.

"Army Chief: Future War Is 'Almost Guaranteed.'" *Association of the United States Army*, October 4, 2016. https://www.ausa.org/news/army-chief-future-war-almost-guaranteed.

"Army Health System Support to Maneuver Forces ATP 4-02.3." Headquarters, Department of the Army, June 2014.

"Army Regulation 25-53 Review of Legality of Weapons Under International Law." Headquarters, Department of the Army, January 1, 1979.

"Army Statement on MEDEVAC Issue." *www.army.mil*, n.d. http://www.army.mil/article/72250/Army_statement_on_MEDEVAC_issue.

"Army Sustainment: Medical Evacuation Planning in Support of the Brigade Combat Team." Accessed February 19, 2018. http://www.almc.army.mil/alog/issues/JanFeb12/Medical_Evacuation.html.

Austin, Tony K. "Aeromedical Evacuation - the First 100 Years." *ADF Health* 3, April 2002 (April 2002): 43–46.

Avery, Scott. "Restructuring the Medical Evacuation Battalion." U.S. Army Command and Staff College, 2000.

"Aviation Digest." Doctrine Division, Directorate of Training and Doctrine (DOTD), U.S. Army Aviation Center of Excellence (USAACE), Fort Rucker, December 2014.

Bailey, Jeffrey COL, Mary Ann Spott, Geroge P COL Costanzo, James CAPT Dunne, Warren Col Dorlac, and Brian Col Eastridge, eds. "Joint Trauma System." U.S. Department of Defense, U.S. Army Institute for Surgical Research, n.d.

Baker, James E. *In the Common Defense: National Security Law for Perilous Times*, 2014.

Barrett, Thomas. "Medical Evacuation and Exception by the United States," October 9, 2017.

Bastain, Nathaniel D. CPT, David Brown, Lawrence Fulton, Robert COL Mitchell, Wayne Pollard, Mark Robinson, and Ron Wilson. "Analyzing the Future of Army Aeromedical Evacuation Units and Equipment: A Mixed Methods, Requirements-Based Approach." *Military Medicine*, November 14, 2013. doi:10.7205/MILMED-D-12-00370.

Brady, Patrick Henry, and Meghan Brady Smith. *Dead Men Flying: Victory in Viet Nam : The Legend of Dust Off, America's Battlefield Angels*. New York: WND Books, 2012.

Carnazza, Vincent. "Enhancing Strategic Oversight of Intra-Theater Aeromedical Evacuation." *Aviation Digest* 2, no. 4 (December 2014): 6–9.

"Casualty Evacuation Helicopters: Reevaluating the Role of the Dustoff in the Vietnam War." *HistoryNet*, June 12, 2006. http://www.historynet.com/casualty-evacuation-helicopters-reevaluating-the-role-of-the-dustoff-in-the-vietnam-war.htm.

Cavaleri, David P. "The Law of War: Can 20th-Century Standards Apply to the Global War on Terrorism?" Combat Studies Institute Press, n.d. http://usacac.army.mil/cac2/cgsc/carl/download/csipubs/cavaleri_law.pdf.

Cole, Alan, Phillip Drew, Rob McLaughlin, and Dennis Mandsager. "SANREMO HANDBOOK ON RULES OF ENGAGEMENT." international Institute of Humanitarian Law, Sanremo, November 2009.

Corn, Geoffrey S., Jimmy Gurulé, Eric Talbot Jensen, and Peter Margulies. *National Security Law: Principles and Policy*. Aspen Student Treatise Series. New York: Wolters Kluwer Law & Business, 2015.

Costello, Cory N. "Defense Secretary Robert Gates' War for 60-Minute Evacuation Response." United States Army War College, 2015.

Defense Health Board. "Combat Trauma Lessons Learned from Military Operations of 2001-2013." Department of Defense, March 9, 2015.

"Defense.Gov News Article: Face of Defense: Airmen Augment Soldiers for Medevac Missions." Accessed September 25, 2017. http://archive.defense.gov/news/newsarticle.aspx?id=48542.

"Defense.Gov News Article: Medevac Helo Attacked During Rescue of Afghan Child." Accessed September 25, 2017. http://archive.defense.gov/news/newsarticle.aspx?id=347.

"Defense.Gov News Article: Medevac Initiatives Save Lives in Afghanistan." Accessed September 23, 2017. http://archive.defense.gov/news/newsarticle.aspx?id=63254.

Department of Defense Law of War Manual. Office of General Counsel Department of Defense, 2015.

Deptula, David A. LtGen (Ret). "Beyond the 'Bomber.'" Mitchell Institute for Aerospace Studies, 2015.

Dickey, Nancy D., Donald Jenkins, and Frank K. Butler. "Tactical Evacuation Care Improvements within the Department of Defense 2011-03," n.d.

"DOD 5100.01 Functions of the Department of Defense and Its Major Components." Accessed January 8, 2018. https://fas.org/irp/doddir/dod/d5100_01.pdf.

"DOD Dictionary and Associated Terms. pdf," n.d.

Dunlap, Charles. "Legal Issues in Coalition Warfare: A US Perspective." *International Law Studies* 82, no. The Law of War in the 21st Century: Weaponry and the Use of Force (n.d.): 221–31.
"Editors Not," n.d.

Ervin, Mark D. "Air Force Special Operations Command Special Operations Surgical Team (SOST) CONOPS." *Journal of Special Operations Medicine* 8, no. 2 (Spring 2008): 8.

"FM 3-0 Operations." Headquarters, Department of the Army, October 2017.

"FM 4-02 Army Health System." Headquarters, Department of the Army, August 2013.

"Forward MEDEVAC Challenges." *Joint Air Power Competence Centre*, November 13, 2013. https://www.japcc.org/forward-medevac-challenges/.

Friedman, Thomas L. *Thank You for Being Late: An Optimist's Guide to Thriving in the Age of Accelerations*. First edition. New York: Farrar, Straus and Giroux, 2016.

Fulton, Lawrence, Bernie Kerr, James M. Inglis, Matthew Brooks, and Nathaniel D. Bastian. "Evaluating MEDEVAC Force Structure Requirements Using an Updated Army Scenario, Total Army Analysis Admission Data, Monte Carlo Simulation, and Theater Structure." *Military Medicine* 180 (July 2018).

"Future Warfare » Home." Accessed January 14, 2018. http://tradocnews.org/tag/future-warfare/.

"Geneva Conventions and Commentaries." Topic. *International Committee of the Red Cross*, July 28, 2014. https://www.icrc.org/en/war-and-law/treaties-customary-law/geneva-conventions.

"Geneva Conventions and Commentaries." Topic. *International Committee of the Red Cross*, July 28, 2014. https://www.icrc.org/en/war-and-law/treaties-customary-law/geneva-conventions.

Green, Bruce. "Challenges of Aeromedical Evacuation in the Post-Cold-War Era." *Aerospace Power Journal; Maxwell AFB* 15, no. 4 (Winter 2001): 14–26.

Guerdan, Bruce R. "United States Air Force Aeromedical Evacuation- A Critical Disaster Response Resource." *American Journal of Clinical Medicine* 8, no. 3 (Fall 2011): 153–56.

Henckaerts, Jean-Marie. "Study on Customary International Humanitarian Law: A Contribution to the Understanding and Respect for the Rule of Law in Armed Conflict." *International Law Studies* 82, no. The Law of War in the 21st Century: Weaponry and the Use of Force (n.d.): 37–79.

Henckaerts, Jean-Marie, and Lousie Doswald-Beck. "Customary International Humanitarian Law Volume I: Rules." Cambridge University Press, 2009.

"Historic C-9 Heads to Andrews for Retirement." *U.S. Air Force*. Accessed February 5, 2018. http://www.af.mil/News/Article-Display/Article/133275/historic-c-9-heads-to-andrews-for-retirement/.

"How the Army Is Slow to Meet MEDEVAC Challenges in the 21st Century." *MEDEVAC Matters*, April 1, 2012. https://medevacmatters.org/2012/04/01/how-the-army-is-slow-to-meet-medevac-challenges-in-the-21st-century/.

Howard, William G. "History of Aeromedical Evacuation in the Korean War and Vietnam War," June 6, 2003.

Hudak III, Joseph James. "The Origins of the 'Golden Hour' of Medical Care and Its Applicability to Combat Medicine." U.S. Army Command and Staff College, 2015.

ICRC. “Red Cross Red Crescent.” ICRC, 2014.

“Inside Afghanistan’s Deadly Copter War.” *WIRED*. Accessed December 29, 2017. https://www.wired.com/2011/08/afghanistans-copter-war/.

“International Review of the Red Cross.” *Customary Law* 87, no. 857 (March 2005). https://www.icrc.org/eng/assets/files/other/icrc_002_0860.pdf.

“International Review of the Red Cross Customary Law,” n.d.

“Joint Publication 4-02 Health Service Support.” Department of Defense, July 26, 2012.
“JP4_02.pdf,” n.d.

Judson, Jen. “Future Vertical Lift Poised to Get Army out of the Acquisition Dark Ages.” *Defense News*, January 31, 2018. https://www.defensenews.com/land/2018/01/30/future-vertical-lift-plan-poised-to-lead-army-out-of-acquisition-dark-ages/.

Jun 25, 2013 _Tony Osborne | Aerospace Daily, and Defense Report. “German NH90s Operational In Medevac Role.” Accessed February 5, 2018. http://aviationweek.com/awin/german-nh90s-operational-medevac-role.

Kotwal, Russ S., Jeffrey T. Howard, Jean A. Orman, Bruce W. Tarpey, Jeffrey A. Bailey, Howard R. Champion, Robert L. Mabry, John B. Holcomb, and Kirby R. Gross. “The Effect of a Golden Hour Policy on the Morbidity and Mortality of Combat Casualties.” *JAMA Surgery* 151, no. 1 (January 1, 2016): 15–24. doi:10.1001/jamasurg.2015.3104.

Lane, Ian COL, Zsolt CAPT Stockinger, Samuel COL Sauer, Mark COL Ervin, Michael COL Writ, Stephen Surg CAPT Bree, Kirby COL Gross, Jeffrey COL Bailey, Timothy BRIG Hodgetts, and Elizabeth COL Mann-Salinas. “The Afghan Theater: A Review of Military Medical Doctrine from 2008-2014” 182 (April 2017): 32–40.

“Launch of the Updated Commentary on the First Geneva Convention.” Event. *International Committee of the Red Cross*, February 19, 2016. https://www.icrc.org/en/event/launch-updated-commentary-first-geneva-convention.

Mandril, Edward F. COL. “The Urgent Need for a Comprehensive, Fully Integrated, Joint Intra-Theater Aeromedical Evacuation System.” Maxwell AFB: Air War College, April 6, 2017.

Mangas, Rachel, and Matthew Festa. *Operational Law Handbook*. The Judge Advocate General’s Legal Center and School, U.S. Army, 2016.

Margot, Miguel A. Lejeune F. “Aeromedical Battlefield Evacuation Under Endogenous Uncertainty in Casualty Delivery Times,” n.d.

"Medevac Crews in Afghanistan Increase En-Route Patient Care." *Www.Army.Mil*. Accessed February 5, 2018. https://www.army.mil/article/93788/medevac_crews_in_afghanistan_increase_en_route_patient_care.

"MEDICAL EVACUATION ATP 4-02.2." Headquarters, Department of the Army, August 2014. http://www.apd.army.mil/epubs/DR_pubs/DR_a/pdf/web/ATP%204-02x2%20-%20C1%20INCL%20FINAL1.pdf.

"Meet The Medical Emergency Response Team in Afghanistan." *Forces Network*. Accessed January 14, 2018. https://www.forces.net/news/raf/meet-medical-emergency-response-team-afghanistan.

Military.com. "German Medevac in Afghanistan." Video. *Walter Sobchak*. Accessed February 5, 2018. http://www.military.com/video/operations-and-strategy/afghanistan-conflict/german-medevac-ops-in-afghanistan/4186466743001.

"Miserable, Disobedient & Victorious: Gen. Milley's Future US Soldier." *Breaking Defense*. Accessed January 22, 2018. https://breakingdefense.com/2016/10/miserable-disobedient-victorious-gen-milleys-future-us-soldier/.

"Modern Medevac Mobilized." *Rotor & Wing International*, October 1, 2004. http://www.rotorandwing.com/2004/10/01/modern-medevac-mobilized/.

"Nato-Medical-Evacuation-in-Afghanistan-Mp-Hfm-157-05.Pdf." Accessed February 5, 2018. https://stopthemedevacmadness.files.wordpress.com/2012/02/nato-medical-evacuation-in-afghanistan-mp-hfm-157-05.pdf.

"No Safe Place In Next War: The Army's Expanded Battlefield." *Breaking Defense*. Accessed September 23, 2017. http://breakingdefense.com/2017/09/no-safe-place-in-next-war-the-armys-expanded-battlefield/.

"No Safe Place In Next War: The Army's Expanded Battlefield « Breaking Defense - Defense Industry News, Analysis and Commentary." Accessed October 8, 2017. https://breakingdefense.com/2017/09/no-safe-place-in-next-war-the-armys-expanded-battlefield/.

Olson, Chris M., Jeffery Bailey, Robert Mabry, Stephen Rush, Jonathan Morrison, and Eric Kuncir. "Forward Aeromedical Evacuation: A Brief History, Lessons Learned from the Global War on Terror, and the Way Forward for US Policy." Accessed August 9, 2017. http://www.dtic.mil/docs/citations/ADA614622.

Peterson, Nolan. "'People Are Going to Get Hurt': America's Quiet War in Iraq." Text. *The National Interest*. Accessed September 23, 2017. http://nationalinterest.org/blog/the-buzz/%E2%80%98people-are-going-get-hurt%E2%80%99-americas-quiet-war-iraq-16150.

Pope, Craig D., Christopher Wright, Johathan B. Lundy, Giles R. Nordmann, Daniel Grower, Samuel Fricks, Larry N. Smith, and Stephen Rush. "Military Prehospital Medicine." In *Combat Anesthesia: The First 24 Hours*. Accessed January 14, 2018. http://www.cs.amedd.army.mil/FileDownloadpublic.aspx?docid=64a9ef2e-d6b4-421e-8b50-b5e15fc28751.

"Quadrennial Defense Review." Department of Defense, 2014.

"Recommendations." *MEDEVAC Matters*, February 19, 2012. https://medevacmatters.org/goals/.

"Red Air: America's Medevac Failure." Accessed September 25, 2017. https://www.michaelyon-online.com/red-air-americas-medevac-failure.htm.

Roedig, Erich. "NATO Joint Medical Support - Reality and Vision." Neuilly-sur-Seine Cedex, France: Research and Technology Organization North Atlantic Treaty Organization, September 1, 2004.

Roedig, Erich. "Aeromedical Evacuation." NATO, n.d.

Ryan, John, and Tony Dokoupil On 11/5/12 at 1:00 AM. "DUSTOFF 73 and the 'Valley of Death.'" *Newsweek*, November 5, 2012. http://www.newsweek.com/afghanistans-valley-death-medevac-teams-miracle-rescue-63779.

Sabiston, Erik. *Dustoff 7-3: Saving Lives under Fire in Afghanistan*. North Hills, CA: Warriors Pub. Group, 2015.

Sanna, Harry. *Trauma*. The Colony Media, 2018.

Sauer, Samuel W., John B. Robinson, Michael P. Smith, Russ S. Kotwal, Robert L. Mabry, Frank K. Butler, Zsolt T. Stockinger, Jeffrey A. Bailey, Mark E. Mavity, and Duncan A. Gilles. "Saving Lives on the Battlefield (Part II) - One Year Later A Joint Theater Trauma System and Joint Trauma System Review of Prehospital Trauma Care in Combined Joint Operations Area - Afghanistan (CJOA-A) Final Report, 30 May 2014." BSA Fort Sam Houston, TX 78234: United States Army Institute of Surgical Research, July 1, 2015.

Schmitt, Michael N., Charles H.B. Garraway, and Dinstein, Yorman. "The Manual on the Law of Non-International Armed Conflict with Commentary." International Institute of Humanitarian Law, 2006. http://www.iihl.org/wp-content/uploads/2015/12/Manual-on-the-Law-of-NIAC.pdf.

September 30, Ashley Welch CBS News, 2015, and 2:00 Pm. "'Golden Hour' Policy Saved Hundreds of U.S. Troops." Accessed September 23, 2017. https://www.cbsnews.com/news/golden-hour-policy-decreased-combat-deaths-among-u-s-troops/.

Shanker, Thom. "Gates Seeks to Improve Battlefield Trauma Care in Afghanistan." *The New York Times*, January 27, 2009, sec. Washington. https://www.nytimes.com/2009/01/28/washington/28military.html.

Shirey, Eric CDR. "Joint Aeromedical Evacuation – Why Isn't It Adequate for the Combat Zone?" Naval War College, May 18, 2004.

"Sikorsky HH-60M MEDEVAC Black Hawk Helicopter." *Army Technology*. Accessed February 19, 2018. http://www.army-technology.com/projects/sikorsky-hh-60m-medevac-black-hawk-helicopter/.

Smith, Michael Sean. "The Protection of Medical Units Under the Geneva Conventions in the Contemporary Operating Environment." U.S. Army Command and Staff College, 2008.

Snow, Shawn. "No Guaranteed 'Golden Hour' for Marines Headed into the next Big Fight." *Marine Corps Times*, February 15, 2018. https://www.marinecorpstimes.com/news/your-marine-corps/2018/02/15/no-golden-hour-for-marines-headed-into-the-next-big-fight/.

"States Party to the Geneva Conventions and Their Additional Protocols." ICRC Annual Report 2016.

"The Changing Face of Battlefield Medicine." *Motherboard*. Accessed September 23, 2017. https://motherboard.vice.com/en_us/article/wnjv79/the-changing-face-of-battlefield-medicine.

Tobin, Joshua M. "Tactical Evacuation." *Marine Corps Gazette; Quantico* 97, no. 2 (February 2013): 56–57.

"Treaties, States Parties, and Commentaries - Additional Protocol (I) to the Geneva Conventions, 1977 - 24 - Protection of Medical Aircraft - Commentary of 1987." Accessed October 8, 2017. https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=F3856B604A78DFF1C12563CD0043178B.

"Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field,1949." Accessed October 8, 2017. https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Treaty.xsp?documentId=4825657B0C7E6BF0C12563CD002D6B0B&action=openDocument.

"Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field,1949 - 24 - Protection of Permanent Personnel." Accessed October 7, 2017. https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/ART/365-570030?OpenDocument.

"Treaties, States Parties, and Commentaries - Geneva Convention (I) on Wounded and Sick in Armed Forces in the Field,1949 - 36 - Article 36 : Medical Aircraft - Commentary of 2016." Accessed October 7, 2017. https://ihl-

databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=8A6EF1B1ED907F49C1257F7A0056328A.

"Treaties, States Parties, and Commentaries - San Remo Manual on Armed Conflicts at Sea, 1994." Accessed October 4, 2017. https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Treaty.xsp?action=openDocument&documentId=5B310CC97F166BE3C12563F6005E3E09.

"Treaties, States Parties, and Commentaries - San Remo Manual on Armed Conflicts at Sea, 1994." Accessed October 7, 2017. https://ihl-databases.icrc.org/ihl/INTRO/560?OpenDocument.

"Treaties, States Parties, and Commentaries - San Remo Manual on Armed Conflicts at Sea, 1994 - - ." Accessed October 4, 2017. https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/385ec082b509e76c41256739003e636d/7694fe2016f347e1c125641f002d49ce.

UK Forces Afghanistan. "Medical Emergency Response Team (MERT): 24 Hours in Pictures." *UK Forces Afghanistan*, June 3, 2011. https://ukforcesafghanistan.wordpress.com/2011/06/03/medical-emergency-response-team-mert-24-hours-in-pictures/.

"U.S. Institute of Surgical Research - Joint Trauma System and DoD Trauma Registry." Accessed January 14, 2018. http://usaisr.amedd.army.mil/10_jts.html.

"U.S. Military's 'golden Hour' Mandate Is Saving Lives." *Futurity*, October 16, 2015. http://www.futurity.org/golden-hour-trauma-soldiers-1026682/.

USAACE Directorate of Training and Doctrine. "Aviation Digest." *Aviation Digest* 2, no. 4 (December 2014): 52.

Yastrzemsky, J. Ross. "To Arm or Not to Arm? An Examination of the U.S. Army's Aeromedical Evacuation Procedures Through a Professional Lens." *Aviation Digest* 2, no. 4 (December 2014): 37–42.

n.d.