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MASTER OF MILITARY STUDIES

**USAF COMBAT RESCUE HELICOPTER:
ADDRESSING JOINT FORCE CAPABILITY SHORTFALLS**

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

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Executive Summary

Title: USAF Combat Rescue Helicopter: Addressing Joint Force Capability Shortfalls

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Thesis: Over a decade of sustained, multi-theater combat operations in the wake of 9/11 has placed unprecedented demands on special operations forces (SOF) helicopters and combat search and rescue (CSAR) rotary-wing assets. By 2005, the demand for these low-density capabilities led to significant shortfalls in both equipment and personnel. It is incumbent on the US military to invest in a heavy-lift helicopter, capable of conducting both CSAR and special operations missions, in order to prevent this resource shortfall from creating a critical capability shortfall.

Discussion: Responding to the shortfalls in CSAR, the USAF recently opened a request for proposals (RFP) for the new Combat Rescue Helicopter (CRH), to replace its aging fleet of HH-60Gs. This initiative provides the opportunity to not only address the shortfalls in CSAR capabilities, but to substantially augment rotary-wing support to SOF. The RFP must drive the equipment, personnel and organizational changes necessary to meet the demands of each of these critical capabilities. This CRH, while a direct replacement of the HH-60G, would provide increased capability in its primary CSAR role, while providing the necessary capabilities to support SOF when necessary; mitigating the risks associated with current shortfalls. Ultimately, the disparity between requirements, resources, and capabilities of SOF and CSAR rotary-wing assets is a risk that is not likely to decrease in the future.

Conclusion: Immediate action, through the USAF CRH initiative, is necessary to ensure continued rotary-wing support to SOF and CSAR throughout the range of military options (ROMO) in the years to come.

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Preface

The following discussion seeks to bring attention to a critical joint force capability shortfall in rotary-wing support for special operations and combat search and rescue. With a growing demand for these specific enablers, the current resource shortfalls are likely to become critical capability gaps as the military expands to a more distributed global force. The US Air Force, through an initiative to replace its aging fleet of HH-60G Pavehawk helicopters, has an opportunity to address these shortfalls by acquiring a modern, highly capable, heavy lift CSAR helicopter, that can support both critical missions. While not an aircraft comparison study, I will detail some of the advantages and disadvantages to current CRH competitors. Ultimately, this discussion will bring to light the critical shortfalls and mitigation strategies.

I would like to thank those who provided generous insight through personal interviews, and those who assisted in mentorship of this project. I hope the discussion that follows will you a clear understanding of the critical capabilities that organic rotary-wing forces provide to both SOF and CSAR. Additionally, I hope to add support to the expansion of the CRH project, to effectively address the joint force shortfalls of the future.

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The challenges related to medium and heavy vertical lift, in hostile and austere environments, are among the most pressing the Department of Defense faces today.¹

Over a decade of sustained, multi-theater combat operations in the wake of 9/11 has placed unprecedented demands on the American military. Specifically, extreme demands have been placed on those rotary-wing forces that support special operations forces (SOF) and combat search and rescue (CSAR). By 2005, the demand for these low-density capabilities led to significant shortfalls in both equipment and personnel. Responding to the shortfalls in CSAR, the USAF recently opened a request for proposals (RFP) for the new Combat Rescue Helicopter (CRH), to replace its aging fleet of HH-60Gs.² This initiative provides the opportunity to not only address the shortfalls in CSAR capabilities, but to substantially augment rotary-wing support to SOF. The RFP must drive the equipment, personnel and organizational changes necessary to meet the demands of each of these critical capabilities. It is incumbent on the USAF to invest in a heavy-lift helicopter, capable of conducting both CSAR and special operations missions, in order to prevent this resource shortfall from creating a capability shortfall. This helicopter, while a direct replacement of the HH-60G, would provide increased capability in its primary CSAR role, while providing the necessary capabilities to support SOF when necessary; mitigating the risks associated with current shortfalls. Ultimately, the disparity between requirements, resources, and capabilities of SOF and CSAR rotary-wing assets is a risk that is not likely to decrease in the future. Immediate action, through the CRH initiative, is necessary to ensure continued rotary-wing support to SOF and CSAR throughout the range of military options (ROMO) in the years to come.

SCOPE

To effectively portray the need for a heavy-lift CRH, it is necessary to understand the current shortfalls in SOF/CSAR rotary-wing support, anticipated demands of the future, capabilities/limitations of potential replacement helicopters, and its proposed employment methodology. A primary consideration is that global demand for SOF and their respective enablers has outpaced US Special Operations Command (SOCOM) current rotary-wing assigned organic capability.³ A myriad of factors led to this shortfall including combat losses, the retirement of the Air Force's MH-53M, delays in CV-22 delivery, and significant growth in SOF ground forces. SOCOM, in an attempt to mitigate these shortfalls, undertook multiple initiatives which included an increase in MH-47 and MH-60 airframes to Army Special Operations Aviation Command (ARSOAC), and increased reliance on conventional assets from the general purpose force (GPF). Unfortunately, these initiatives are inadequate and compound the risks associated with known shortfalls. A heavy-lift, replacement CSAR helicopter, with highly trained crews, provides the critical capability to augment SOF and mitigate this risk.

Like SOF, high demands upon the operators and enablers, to include maintenance, logistic and support personnel, in the Air Force HH-60G community have created dangerous operational shortfalls in rotary-wing CSAR capability.⁴ Factors leading to these shortfalls are rapidly decreasing aircraft availability rate and the unabated demand for personnel recovery (PR) forces around the globe. To address these shortfalls, the Air Force initiated the operational loss replacement program (OLRP) to

address critical availability aircraft issues. Unfortunately, this initiative is merely an immediate, short-term fix and does not address long-term requirements. The RFP for a replacement helicopter provides the opportunity to fulfill the requirements of the CSAR community, but it must be expanded to address the shortfalls in SOF. This can only be done with the acquisition of a heavy-lift helicopter, capable of supporting each mission set.

Although the Defense Department has identified these resource shortfalls and taken steps to mitigate them, demand for these specific capabilities will remain high in the future.⁵ The proposed cessation of major combat operations in Afghanistan will likely have little effect on SOF and CSAR forces. Even a full redeployment of all U.S. forces from Afghanistan provides these forces with only a temporary reprieve. The threat environment outside of the Afghanistan-Pakistan region requires a distribution of forces, tasked to conduct counter-terrorism (CT) and counter-insurgency (COIN) operations, while remaining poised for potential major combat operations (MCO) in support of numerous geographic combatant commands (GCC). In turn, a wider distribution of American special operations and conventional forces creates an increased demand for capable, dispersed PR/CSAR capability. A modern, heavy-lift, CSAR helicopter provides the necessary capabilities to support both an evolving PR mission, as well as expanding SOF requirements.

The USAF CRH initiative to replace its aging fleet of HH-60G CSAR helicopters must be the catalyst to make appropriate equipment, personnel and organizational

changes necessary to meet the demands of the future. In the request for a replacement CSAR helicopter, the Air Force stated that they are committed to fair, open, and transparent process that meets the demands of the warfighter.⁶ That competitive process must take into account the likely changes in force distribution, adapt to the changing security environment, and address the shortfalls outside of the PR/CSAR community.

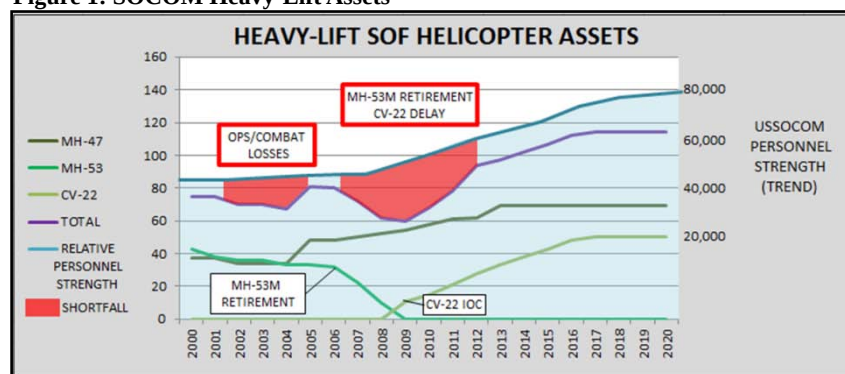
Next, though not the primary purpose of this discussion, it is necessary to compare various rotary-wing and tiltrotor assets based upon mission requirements and aircraft capability, within the fiscal constraints of the RFP. Through comparison of the Bell/Boeing CV-22, Boeing CH-47, Sikorsky UH-60M, S-92 and CH-53K, it is evident that the USAF must expand its competition beyond the scope of CSAR alone and implied favor of the HH-60M. The joint force as a whole must now embrace the CRH initiative to mitigate a critical, foreseeable, capability shortfall in the coming decades.

Lastly, an example geographic template and task organization detail the employment of a heavy-lift CSAR helicopter, highly adept in its primary role, and well-suited to support SOF operations as required by the joint force commander (JFC). This template depicts the ideal employment of a proposed CRH in both its primary CSAR role, as well as its SOF-support role. In order to mitigate capability gaps and posture to meet future requirements, the USAF must acquire a more capable airframe and prepare to employ it outside of a pure CSAR/PR role.

SOF ROTARY-WING SHORTFALLS

Special operations rotary-wing aviation is at a critical crossroads between today's under-resourced requirements and the critical demands of the future security environment.⁷ Various factors led to these resource shortfalls including operational losses, the retirement of the Air Force MH-53M PaveLow, delays in delivery of the Air Force CV-22 Osprey, and unprecedented growth of SOF ground forces. Figure 1 displays SOCOM heavy-lift helicopter resources from FY2000 through FY2012, with an expansion to FY2020 based on on-going initiatives.⁸ In the immediate wake of 9/11, SOCOM operated a robust fleet of highly specialized light, medium and

Figure 1: SOCOM Heavy-Lift Assets



heavy-lift
helicopters from
both the US Army
and Air Force.
Unfortunately,

operating conditions in Iraq, and specifically Afghanistan, took a substantial toll on SOF helicopters in both combat losses and accelerated use rates.⁹ From the fall of 2001 until the end of 2012, nearly thirty helicopters were lost while supporting SOF during operations in Afghanistan, Iraq, and elsewhere.¹⁰ These losses and the associated high-tempo operations pushed SOF aviation well beyond planned attrition rates.¹¹ As stated in Congressional testimony by the Assistant Secretary of Defense for Special Operation and Combating Terrorism, the sustained deployment of special operations task forces, currently in over 75 countries, had outpaced SOCOM's organic

rotary-wing capacity.¹² With over 40% of SOF helicopters either deployed or on CONUS-alert posture, the individual losses are significant and a balance must be struck between current requirements and forecast demands.¹³

In addition to operational losses and CONUS-alert requirements, the retirement of the Air Force MH-53M PaveLow IV helicopter in 2008, exacerbated the capability gap to support on-going wars in Iraq, Afghanistan and elsewhere. Due to increasing operating costs, aging equipment and parts supply challenges, USSOCOM and the USAF commenced the gradual retirement of the PaveLow in 2007.¹⁴ Due to increasing demand for SOF helicopters, six PaveLows continued operating in Iraq until their retirement date on 30 September 2008 when they were then transported to CONUS for mothball or museum destinations. The retirement of over thirty aircraft, as seen in Figure 1, without an allocated replacement, cut organic SOF heavy-lift support by over 30%. This significant cut in resources compounded the notion that SOCOMs organic rotary-wing capability is inadequate for the operational needs of the ground forces.¹⁵

The plan to retire the PaveLow was predicated on the delivery of the new CV-22 Osprey as an indirect replacement to support SOCOM. While the CV-22 presents significant capabilities, particularly increased speed and range, it is a complimentary capability, not a direct replacement for heavy lift helicopters.¹⁶ Additionally, the CV-22 experienced delays in delivery and was not operational in Iraq until late-summer of 2009; nearly two years later than anticipated.¹⁷ Unfortunately, mission ready rates during its initial deployment to Iraq were approximately 60%.¹⁸

The mission ready rate increased to approximately 70% during subsequent deployments to southern Afghanistan through 2011, yet this remains short of the desired 80% rate.¹⁹ As the PaveLow retirement and CV-22 delay occurred during continuous combat operations, the capability imbalance grew larger while the rest of SOCOM continued to expand.

Operational aircraft losses and USAF fleet restructuring were not the only causes for the shortfall in rotary-wing SOF. The most significant cause of imbalance between requirements and capabilities arose with the unprecedented growth of SOF ground forces between 2001 and the present. The 2006 Quadrennial Defense Review (QDR) identified a requirement to expand SOF, but did not address aviation expansion efforts.²⁰ Due to expanding CT/COIN requirements throughout the globe, the SOCOM budget has nearly tripled since 2001. In addition to the influx in budget, SOCOM personnel strength has grown from approximately 34,000 in 2001, to nearly 70,000 in 2013.²¹ This dramatic increase of SOF ground forces and enablers, depicted in blue on Figure 1, did not include a similar expansion of aviation enablers. This imbalanced growth exacerbated the trend that SOF aviation remains too lean to support the expanding roles of SOCOM in the post-9/11 era.²²

A 2009 RAND study on SOF aviation states that since 2001, the supply for SOF aviation has fallen well short of the demand.²³ Additionally, global taskings for SOF have tilted the balance precariously, and the continued expansion of SOF ground forces, without commiserate growth of aviation enablers, threatens to derail it altogether.²⁴ Consequentially, SOF aviation capability is stretched and cannot

support all SOF ground forces that require rotary lift.²⁵ The most effective means to mitigate these shortfalls is the acquisition of additional medium/heavy lift helicopters, with highly qualified crews, trained to carry out a wide range of dynamic combat operations in support of SOF.

MITIGATION INITIATIVES FOR SOF ROTARY-WING SHORTFALLS

By 2010, in an attempt to mitigate the widening capability gap, SOCOM launched multiple initiatives to increase the availability of rotary-wing resources to support global SOF requirements. These included modernization and expansion of the Army 160th Special Operations Aviation Regiment (SOAR) MH-47 fleet through a service-life extension program (SLEP), and an increased reliance on GPF aircraft. Although these initiatives have increased the quantity of rotary-wing resources, they expose continued manning and personnel challenges. Through the SLEP, the 160th SOAR will increase its MH-47G fleet, from less than 40 aircraft in 2000, to a proposed 69 aircraft by the end of 2015.²⁶ This expansion in aircraft resources created a shortage in trained 160th SOAR aircrew. Since late 2012, US Army Special Operations Command (USASOC) has worked to increase recruitment into the 160th SOAR which is currently manned at only 75%.²⁷ The initiative to add approximately 300 pilots has proved challenging due to the chronic shortage of Army helicopter pilots since 2001.²⁸ The high operational tempo, low recruiting numbers, and the need to uphold training standards has made this effort difficult. When asked about SOF aviation capability, the command chief warrant officer for ARSOAC stated

that "demand for this capability has never been higher, and current manning levels make meeting our operational commitments a concern."²⁹

To mitigate these concerns, SOCOM was forced to look beyond its own structure to conventional forces for rotary-wing support to SOF. In 2008, upon retirement of the MH-53M, a US Army National Guard CH-47 unit was tasked in direct support of Combined Forces Special Operations Command Central-Iraq (CFSOCC-I). Unlike the MH-53M, the CH-47 unit was tasked primarily with resupply and logistics mobility missions. This maximized the ability of organic-SOF units from the 160th SOAR to carry out the more demanding direct action (DA) missions and other SOF-specific taskings. Additionally, CFSOCC-I was allocated three US Navy HH-60S aircraft to support medium-lift taskings.³⁰ The increase in SOF operational tempo between 2006-2011 in both Iraq and Afghanistan created an even higher demand for aviation support, which in turn forced further dependence on GPF for rotary wing lift. In both theaters, conventional Army UH-60 and CH-47 units were tasked in direct support of SOF for not only mobility missions, but for direct action assaults. In Afghanistan today, nearly 50% of the rotary-wing/tiltrotor support comes from the GPF.³¹ Due to an increased reliance on GPF and the continued demand for conventional rotary-wing forces, the Army has reorganized a number of active components to form two additional combat aviation brigades.³² Likewise, the US Navy, in response to the 2010 QDR, dedicated two Helicopter Sea Combat (HSC) squadrons as direct support to Naval Special Warfare Command (NAVSPECWARCOM).³³ Although the CAB and HSC initiatives increase the

number of available rotary wing assets in the defense inventory, they are merely stop-gap measures as neither are actually assigned to SOCOM.

An additional repercussion of these shortfalls is an increased dependence upon GPF for rotary-wing support. This dependence runs contrary to USSOCOM's mandate that "SOF cannot be mass produced" and that "competent SOF forces cannot be created after emergencies occur".³⁴ As stated during Congressional hearing related to the subject, the general purpose force is not trained to the same standards as SOF.³⁵ Additionally, the standard operating procedures (SOP), tactics, and techniques of SOF differ from the GPF; increasing pre-deployment training requirements of both aircrew and ground forces. Some advocate that this dependence is directly supported by the SOF truth that "most special operations require non-SOF assistance."³⁶ Unfortunately, the specific demands of many SOF missions necessitate a dedicated SOF aviation force. The common SOP and habitual training relationships fostered within SOCOM are the key to SOF capability. Although dedicated SOF rotary-wing support is necessary for dynamic, and direct actions missions, a requirement remains for mobility, resupply, and quick reaction force (QRF) coverage. This type of support is where the direct support GPF can provide a critical capability to SOF, subsequently freeing up dedicated-SOF assets for direct action, or higher risk missions.

SOCOMs initiatives for SOF rotary-wing aviation have been somewhat effective in mitigating the resource shortfall. Unfortunately, the increased number of aircraft has revealed a potential capability shortfall with a lack of specialized, highly trained

SOF crews. The dependence upon the GPF has not mitigated this capability shortfall and the requirement remains unfulfilled. In the current fiscally constrained environment, it is necessary to look beyond SOCOM and the US Army to fill the void in SOF support capability. The need for a medium/heavy lift helicopter, operated by highly trained, specialized crews to support SOF, is a capability that must be embraced by the military; specifically, the Air Force CSAR community.

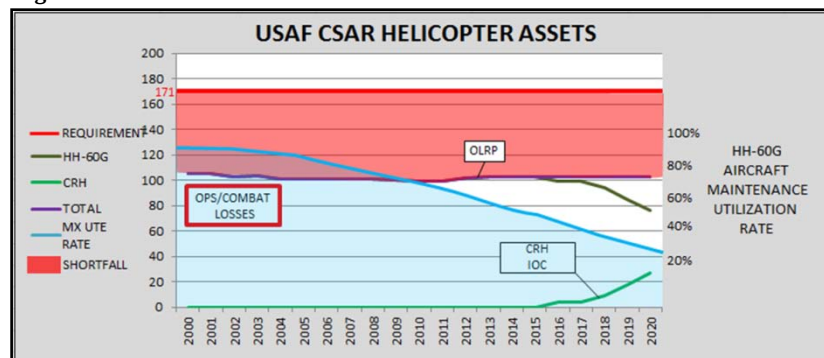
AIR FORCE CSAR ROTARY-WING SHORTFALLS

The demand for CSAR and PR forces, specifically rotary-wing assets, across the globe has increased dramatically in the years since 9/11. Unfortunately, aircraft reliability rates and increased demand have created a worldwide decline in Air Force rescue's capability and capacity to respond to global contingency operations.³⁷ The current fleet of HH-60G Pavehawk helicopters is rapidly approaching the end of its planned service life of 7,000 flying hours per aircraft, with many aircraft exceeding 10,000 flying hours in 2012.³⁸ The loss of seven HH-60G aircraft between Iraq and Afghanistan, coupled with higher than projected use rates have taken a significant toll on aircraft availability rates. According to Congressional Statements, the HH-60G fleet contains only 93 flyable aircraft, from its initial 112 aircraft inventory. From these aircraft, 66 have suffered major structural cracks and over 50 have sustained battle damage.³⁹ In 2010, the availability rate was only 53%, with an associated reliability rate of only 74%.⁴⁰ This means that on any given day approximately half of the aircraft are even available to fly, with only three-quarters of those able to

complete their assigned mission.⁴¹ As shown in Figure 2, in 2011, the HH-60G availability rate remained in the fiftieth percentile, with an estimated decrease in capability rate to less than 50% by 2015.⁴²

Unfortunately, this rapidly decreasing capability is contrasted with an ever-increasing global demand. In addition to the continued demand for HH-60Gs

Figure 2: USAF CSAR Assets



in Afghanistan, security challenges in the Persian Gulf, the Horn of Africa, western Africa and

the Pacific only widen the gap between requirements and capabilities. A report by the Joint Personnel Recovery Agency (JPRA) identified the need for 171 rescue helicopters, also in shown in Figure 2, to meet the requests of service and combatant commanders.⁴³ The nearly 45% resource shortfall in aircraft alone is a critical capability gap that adds substantial risk to US forces. Geographic commands have placed requests to the Joint Staff to meet their CSAR/PR requirements, yet no forces have been allocated. In both 2009 and 2012, the commander of US Africa Command (AFRICOM) requested additional PR assets to support contingency operations throughout East Africa. In response the USAF Air Combat Command (ACC), the force provider, denied the request based on deployment rates and equipment availability.⁴⁴ These unmitigated resource shortfalls have created an operational capability shortfall and American forces must now operate in dangerous

environments with inadequate CSAR/PR coverage.

MITIGATION INITIATIVES FOR CSAR/PR ROTARY-WING SHORTFALLS

In 2005, the Joint Requirements Oversight Council validated a requirement to recapitalize the USAF CSAR helicopter fleet. Soon after, Air Force Special Operations Command (AFSOC), who at the time controlled CSAR assets, released an RFP for a replacement helicopter, labeled CSAR-X.⁴⁵ Multiple corporations competed for the \$15 billion contract to provide 141 aircraft to the Air Force.⁴⁶ In 2006, the Air Force finalized the CSAR-X decision by selecting the Boeing HH-47G Chinook; a highly capable, historically proven aircraft. Unfortunately, protests from competing companies, shifting requirements, a troubled acquisition history, and budgetary concerns led to then Secretary of Defense Robert Gates' cancellation of the entire program.⁴⁷

In 2009, in response to the cancellation of CSAR-X and continued demand, the Air Force launched the HH-60G OLRP. This program used an incremental acquisition strategy to rapidly field modified UH-60M aircraft to CSAR forces in theater.⁴⁸ The program initially sought to replace all previous HH-60G losses and reposture the fleet to 112 aircraft. Budget constraints only allowed for the acquisition of four aircraft, with the final aircraft scheduled for delivery in late 2013.⁴⁹ This initiative is merely a short-term stopgap and does not come close to addressing the imbalance of capabilities and requirements. Fortunately, the 2013 budget includes a \$184 million initiative to address CSAR rotary-wing shortfalls.

This funding is to be used to complete the OLRP and to initiate the CRH competition to replace the HH-60G fleet in 2018.⁵⁰

Prior to discussion of the CRH program, it is necessary to identify the potential future requirements for CSAR/PR, as well as SOF rotary-wing support. The drawdown of forces from Afghanistan in the coming years, will not deliver a reprieve to CSAR and SOF rotary-wing forces, but will increase the demand and distribution of each. It is imperative that the Department of Defense take the appropriate action to support acquisition of a fleet of highly capable helicopters and crews to support each of these expanding roles.

FUTURE DEMAND AND GLOBAL FORCE POSTURE

While impossible to forecast the character of future threats, our Nation and the military must be globally postured to employ throughout the range of military options. The 2011 National Military Strategy (NMS) forecasts the potential nature of future threats and produces a framework to meet these challenges. The NMS dictates that Joint Forces must become more expeditionary in nature and will require a smaller logistical footprint.⁵¹ Forecasting the threat environment outside of Afghanistan, Secretary of Defense Leon Panetta states that future security operations will largely take place outside declared combat zones, using a small footprint approach that includes precision operations, partnered activities, and capacity building.⁵² Defense officials offer that a reliance on smaller teams operating in innovative ways is a central tenet to this new strategy.⁵³ Unfortunately, the current fiscal environment

presents challenges to resourcing such a force, and a greater demand will be placed upon SOF and critical enablers. Secretary Panetta echoed these comments, stating that SOF must be protected and increased as the overall defense budget is reduced.⁵⁴ The increase in SOF budget correlates directly to its increase in authorities and responsibilities.

The 2012 Defense Strategic Guidance details ten primary missions of the US Armed Forces.⁵⁵ USSOCOM and its critical enablers have a primary or significant supporting role in at least seven of the ten primary missions set forth. In addition to Title 10 authorities and responsibilities, USSOCOM has been given lead responsibility for synchronizing DOD plans against global terrorist networks, security force assistance (SFA), as well as countering threat financing to identify and disrupt terrorist financing efforts.⁵⁶ A likely characterization of future operations is the extent to which SOF operate in the pre-crisis and post-crises ends of the conflict spectrum. US forces must focus on building partner capacities, training and equipping allied and partner nation forces, and supporting the Interagency, while maintain the ability to conduct decisive kinetic action.⁵⁷ This myriad of responsibilities can only be addressed with globally dispersed, highly capable, independent forces and enablers. Each distributed force must maintain the organic capability to meet the mandate set forth in national strategy. This requires a combination of both SOF and conventional joint forces to include ground assault forces, advisers, rotary-wing support, ISR, air mobility, logistics, communications, and fires assets. Such a force must also retain organic capability to conduct CSAR

and PR. A postured CSAR/PR force is imperative in an environment that includes distributed ground teams, manned ISR operations, and potential manned strike missions. Current rotary-wing capabilities remain inadequate to support the future security landscape. Despite the increases in funding over the last few years, SOF aviation remains under-resourced, and the decline in CSAR/PR capabilities has created unacceptable risk as seen in AFRICOM's unfulfilled requirements.

The drawdown of US forces from Afghanistan in 2014 will have little effect on the long-term availability of rotary-wing resources to support SOF and CSAR/PR. Though a determination has yet to be made on the exact force structure that will remain after 2014, the presence of any American forces will undoubtedly include a large contingent of SOF and require a continued need for dedicated CSAR/PR support. President Obama echoed these sentiments stating that U.S. forces left in Afghanistan after 2014 would have two goals: to train and assist Afghan forces and to carry out counterterrorism missions aimed at al Qaeda and its affiliates.⁵⁸ Even the potential of a full withdrawal of all American forces in 2014 would offer only a momentary reprieve for SOF and CSAR forces, and would not address the long-term shortfall. For example, since 2008, Air Force HH-60G aircrews have maintained a 1:1 dwell.⁵⁹ This means that time deployed is equal to time at home, in that a three month deployment is followed by only three months at home, and so on. This operational tempo, similar to that of SOF, creates significant personnel shortfalls and challenges in maintaining both personnel and equipment capabilities.

The mandate set forth in the National Military Strategy and Defense Strategic

Guidance significantly increased the demand for SOF and its enablers. Growing threats in the Persian Gulf, the Pacific, and throughout Africa require a widely distributed force structure with organic capability to meet the needs of the respective geographic commander. To meet the strategic guidance set forth, the US military must be resourced to support widely distributed operations, with minimal basing infrastructure, without degradation in capability. Responsible budgetary decisions must be made today to ensure that tomorrow's force is prepared to meet the vexing challenges of the post-Afghanistan security environment. One of the most prevalent of these challenges is the pending acquisition of a capable, medium/heavy lift, combat rescue helicopter. While addressing the immediate shortfalls of global CSAR/PR support, this aircraft and specialized crews would offer substantial augmentation to support the global SOF posture, and maximize rotary-wing capabilities in a resource constrained force.

COMBAT RESCUE HELICOPTER INITIATIVE

In response to ever-increasing demands for rotary-wing CSAR/PR coverage and the declining mission ready rates of the HH-60G, the Air Force has again launched an initiative to address current shortfalls and future requirements. In March 2012, the Air Force released a draft RFP for the combat rescue helicopter program, the successor to the cancelled CSAR-X program.⁶⁰ This initiative must be the catalyst to address organizational, personnel and equipment shortages in joint rotary-wing force. The Department of Defense must expand the scope of the RFP to address not

only shortfalls in CSAR/PR coverage, but to address the need for trained aviators and capable aircraft to support global requirements.

The current CRH RFP is capped at \$6.8 billion; less than half of the budget allocated for the CSAR-X program.⁶¹ From this, the Air Force plans to purchase only 112 aircraft, whereas the CSAR-X program proposed 144 new aircraft. The draft statement of work details the expected production schedule which includes delivery of initial equipment in FY2013, and complete delivery in FY2024.

Anticipated initial operational capability (IOC), shown in Figure 2, is scheduled for FY2018.⁶² Despite the initiative, the current RFP is inadequate and does not address the shortfalls in CSAR/PR capability. With the validated requirement of 171 aircraft, the RFP falls well short of providing capability to the joint force. Additionally, the monetary cap restricts a majority of competitors from entering a proposal at all.

Under the CSAR-X program, four companies competed for selection, yet under the CRH program, only one of five potential bidders remains in the program.⁶³ Due to the RFP structure and terms, the European Aeronautic Defense and Space Company (EADS) of North America, Boeing, Bell, and Northrop Grumman have all decided not to bid on the CRH program.⁶⁴ This leaves only one competitor, Sikorsky Aircraft Corporation, in the running for the CRH contract.⁶⁵ Sikorsky manufactures three viable competitors for the CRH contract; the UH-60M, the S-92, and the CH-53K. Unfortunately, just as the other companies withdrew bids due to cost, the RFP terms likely negate the ability to compete the CH-53K. Without significant restructuring of the RFP and CRH budgetary cap, the Air Force will miss an opportunity to meet

the validated CSAR/PR requirements. Additionally, the RFP constraints will force acquisition of an aircraft that lacks necessary capabilities to support the joint force as a whole. This potential creates a significant risk to both SOF and conventional forces, and fails to support national military objectives in the decades to come.

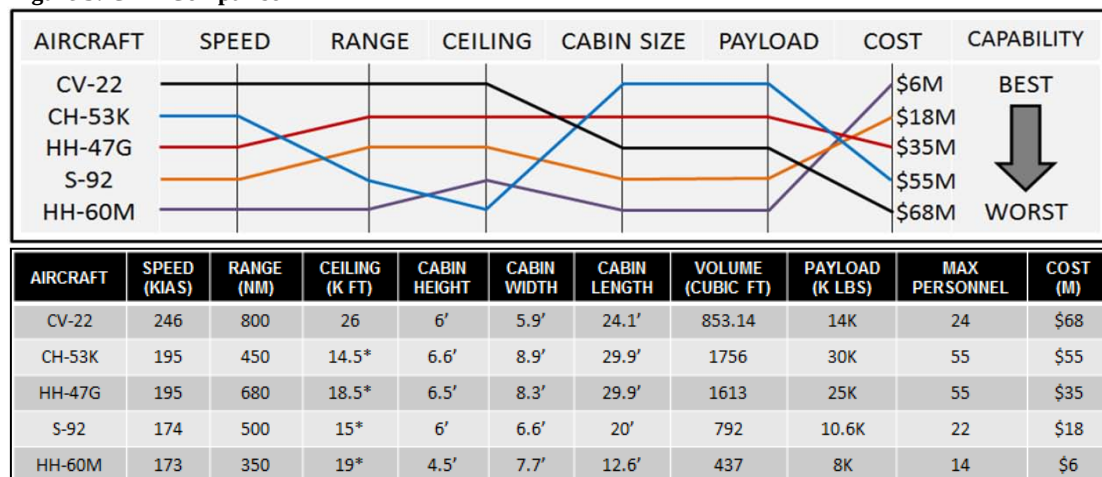
CRH REPLACEMENT COMPETITORS

The CRH initiative provides the military an opportunity to effectively address current and forecast shortfalls in rotary-wing support to CSAR and SOF. Each of these mission sets requires a highly capable aircraft, able to perform in a myriad of environments to include maritime, desert, and mountainous regions. Additionally, the crews must be qualified and capable of carrying out challenging missions in any weather, day and night. The CSAR community boasts the best trained rotary-wing aviators in the Air Force and experience in over a decade of war has created an elite force capable of supporting a wide-range of operations. These forces are adept at their primary role of CSAR and PR, but the dynamic capability they provide is necessary in humanitarian, disaster relief and SOF support roles. It is for the reason that Air Force CSAR crews are the most capable, flexible, and adaptable force to augment global SOF posture, while providing critical PR capabilities. It is critical that this force employ the most capable aircraft, equipped to execute a multitude of missions in support of joint force objectives.

While not the primary purpose of this discussion, it is necessary to compare various aspects to include speed, range, payload, and cabin size. Using various

resources to collaborate data, this comparison easily depicts a stratification of capabilities to meet future requirements.⁶⁶ Figure 3 shows a comparison of five specific aircraft, each one a viable replacement for the aging HH-60G. From this, it

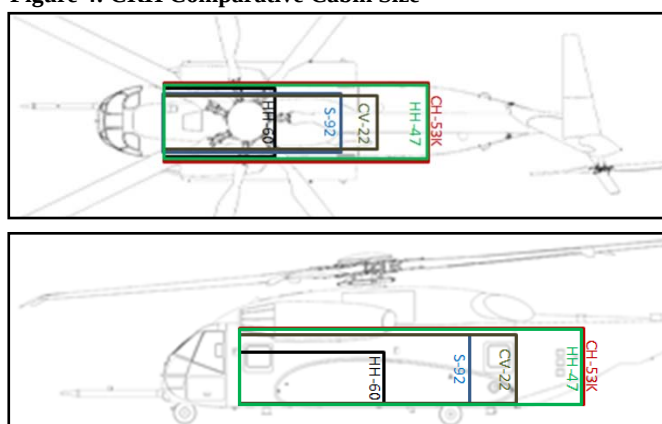
Figure 3: CRH Comparison



is clear that the Boeing HH-47G provides the greatest overall capability, though it lacks the speed and range of the Bell-Boeing CV-22. Interestingly, this supports the initial choice of the HH-47G for the CSAR-X program. Unfortunately, the costs of both the CV-22 and the HH-47G have taken them out the competitive CRH process, and only Sikorsky aircraft

remain. In looking at the HH-60M, S-92, and CH-53K, it is clear that the CH-53K has the greatest overall capability, specifically in the critical

Figure 4: CRH Comparative Cabin Size



aspects of speed, cabin size and payload. Figures 4 shows the relative cabin size of the CH-53K as compared with the other four aircraft. The CH-53K, with its clear advantages and shipboard capability make it the primary Sikorsky choice for the CRH.

Unfortunately, and despite its superior capability, the \$55 million CH-53K is likely too costly to compete for the CRH contract. This leaves only the Sikorsky HH-60M and S-92 as viable competitors for the current RFP. The increased range and payload of the S-92 provide greater capability than the HH-60M. Likewise, the cabin space is nearly doubled, with a subsequent allowance for up to 30% more personnel. Each of these aspects clearly depicts the superiority of the S-92 over the HH-60M. The downside is that each S-92, at \$15 million, is nearly triple the cost of the HH-60M. Although the cost is significantly higher, the capability provided by the S-92 must be embraced if the current RFP remains. The S-92, under the current constraints of the RFP, is the proper choice to replace the HH-60G.

Although the S-92 is the most capable of the fiscally viable competitors, it lacks the necessary capabilities to fully address the shortfalls in CSAR/PR, while providing much needed augmentation to SOF. With a cabin space smaller than the CV-22, the S-92 fails to address the heavy-lift rotary-wing shortfall created by the retirement of the MH-53M. While the 160th SOAR MH-47G maintain this capability, they must be tasked primarily for SOF-specific missions including direct action, hostage rescue, and strategic reconnaissance. Likewise, the CV-22 must maintain its primary tasking as infil/exfil support of SOF, with availability for logistics and resupply based upon SOF requirements. Additionally, cabin size and payload capability of the CV-22 limit its ability to conduct adequate resupply and logistics missions. A heavy-lift, CSAR helicopter fills this critical niche, and provides joint force commanders with a flexible, capable force to carry out missions to include employment of quick reaction

forces (QRF), tactical recovery of aircraft and personnel (TRAP), resupply, and logistics support as needed. A variety of light, medium, and heavy-lift helicopter and tiltrotor SOF assets, augmented by heavy lift CSAR assets provides the greatest flexibility and capability to support distributed forces in future threat environments. Organizational relationships and mission taskings are a critical aspect of future employment, and these must be addressed during consideration of the CRH initiative.

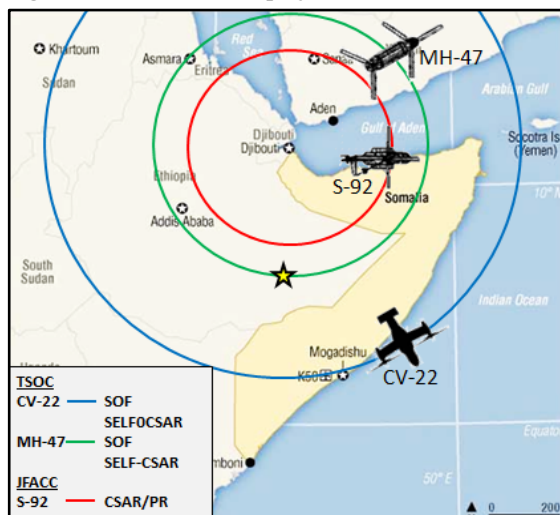
CRH EMPLOYMENT

To most effectively meet the requirements of future, distributed forces, the CRH fleet must be organized to support numerous dispersed forces in multiple, widespread areas. Additionally, they must be task organized to effectively meet theater CSAR/PR taskings, while maximizing critical support to SOF. The selection, training, and proficiency of SOF aviators, operating highly modified aircraft represents the greatest specialized air capability in the world.⁶⁷ Unfortunately, personnel shortages, aircraft losses, and aging equipment have placed an even greater demand on these forces. Despite efforts to recapitalize respective fleets, shortfalls remain, specifically in heavy-lift rotary wing support. Air Force CSAR crews represent a needed capability to support SOF as they undergo similar selection and training; well beyond that of conventional Army or Air Force helicopter pilots. Acquisition of a capable heavy-lift helicopter, through the CRH initiative, will provide CSAR forces a much needed aircraft improvements, and in-turn support joint forces throughout the range of military operations. The distributed nature of future

operations solidifies the need for a highly capable CSAR/PR aircraft, which could augment SOF rotary-wing forces in a variety of roles.

To maximize the employment of joint SOF and CSAR rotary-wing forces, mission sets must be delineated, and task organization must be clarified. A proposal of such employment methodology provides an example that could be applied in nearly any situation. Based upon the training, proficiency, standard operating procedures, and habitual training relationship of joint SOF, the CV-22 and MH-47G fleet would be primarily tasked to conduct all direct action missions. Likewise, the SOF-specific units would be tasked with recovery of organic SOF assets as needed. These SOCOM units would provide support for SOF resupply, mobility, and logistics movements as necessary, based upon DA taskings. This methodology, displayed in a

Figure 5: SOF/CSAR Employment



hypothetical scenario in Figure 5, is similar to current SOF-specific helicopter employment.

SOF-specific units should be distributed based upon needs of ground SOF units, terrain, range and geography. The CV-22 capabilities

of range and speed should be maximized based on the specific area of responsibility (AOR), employing the MH-47G as needed to support distributed forces. Unlike operations in Iraq and Afghanistan, there will likely be a need for widely-dispersed SOF rotary-wing coverage, potentially spanning multiple AORs. The

complimentary capabilities of the CV-22 and MH-47G provide flexibility to the joint force commander and must be employed properly to do so. Unfortunately, the focus on direct action of SOF-specific forces reveals a shortfall in necessary logistic, resupply, and QRF support.

As mentioned previously, the distributed force posture of the future deems CSAR/PR a critical capability. A competent, flexible CSAR/PR force is necessary to address risks of the wide dispersion of American ground forces, manned aviation assets, and support personnel. In a resource constrained environment, forces must be tasked to support missions outside of their primary role when available. A robust CSAR/PR force provides the capability necessary to maximize joint force effects in future contingencies. While providing critical PR coverage, this force would augment SOF rotary-lift as necessary, supporting the joint force. For purposes of this example, the S-92 will depict the CRH employment methodology as seen in Figure 5 scenario. Placing CSAR/PR forces at major support bases, with the option of forward prepositioning, maximizes flexibility to support CSAR/PR coverage and support missions. Similar to operations in Afghanistan, the hub-and-spoke approach affords the opportunity to provide critical CSAR/PR alert coverage, with the advantage of providing ad hoc airlift to support other theater requirements. Excess sorties beyond CSAR coverage would be allocated to support SOF as needed by the joint force commander. Similar to GPF support in Afghanistan, the CSAR forces would remain organized under their respective component commander, but could be tasked as general or direct support to SOF. By keeping the USAF as the force

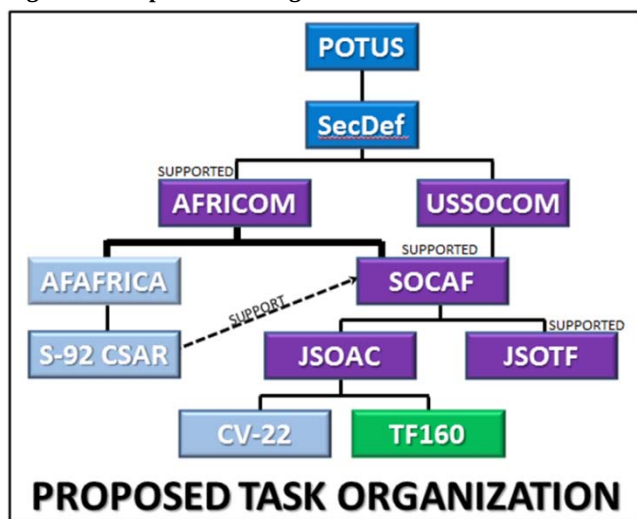
provider, the Joint Force Air Component Commander would retain OPCON of rescue forces. Likewise, SOCOM and the theater special operations command (TSOC) would retain OPCON of SOF rotary-wing forces. This organizational template ensures compliance with previously established service roles for rotary-wing forces mandated by a joint agreement in 1984 called the *31 Initiatives*.

On May 22, 1984, the acting Chiefs of Staff of the Army and Air Force signed a memorandum of agreement delineating the role of airpower within each service. This document, titled the *31 Initiatives*, eliminated duplication of effort for complementary programs, defined respective roles and missions, and identified initiatives that called for joint action and cooperation on specific aspects of combat, doctrine, and funding.⁶⁸ As it pertains to the CRH discussion, two specific initiatives mandate and specify service ownership of both CSAR and rotary-wing SOF support. Initiative #16 stated that the Air Force would maintain proponentcy for search and rescue, with its own SOF providing backup capability. As a compromise, Initiative #17 mandated that the Air Force transfer the responsibility for providing rotary-wing lift support to SOF to the Army.⁶⁹ This initiative provoked great opposition from the Air Force SOF community, and it was not until 2008 that Initiative #17 was fully honored. The retirement of the Air Force MH-53M solidified the mandate and ensured that “AFSOC is out of the rotary-wing business.”⁷⁰

The *31 Initiatives*, though nearly three decades old, continue to drive force planning and organizational structure amongst joint forces. The CRH, and the roles

assigned, must honor this mandate while providing maximum flexibility to joint force commanders (JFC). This issue can be effectively addressed through clear command relationships. Figure 6 shows a template task organization that maximizes CRH

Figure 6: Template Task Organization



availability to the JFC, while providing rotary-wing support to SOF when necessary. While this example shows S-92 CSAR supporting a functional component, it can be paralleled at or below the joint task force

(JTF) level, to either a functional or service component. Taskings from the supported joint force commander, as opposed to the functional commander, alleviates potential over-tasking or misuse. Clear, logical command relationships will ensure that JFCs are able to maximize the capability allocated, while ensuring that critical SOF and CSAR capabilities are maintained.

CONCLUSION

The unprecedented demands of on-going global contingencies have severely restricted the availability and capability of rotary-wing forces to support SOF and theater CSAR. Operational losses, personnel shortages, aircraft reliability, and growing demands have created a situation that requires immediate remedy. The current fleet of USSOCOM rotary-wing and tiltrotor assets cannot adequately support

the expanding requirements of global SOF. Likewise, the Air Force rotary-wing CSAR inventory falls well short of validated requirements and has led to a significant capability gap in numerous theaters. Unfortunately, Americans are forced to operate in austere environments that lack adequate CSAR/PR capability. Despite efforts to mitigate the risks associated with these shortfalls, the availability and posture of organic rotary-wing assets remains inadequate in meeting the requirements of the SOF and CSAR community.

Responding to shortfalls in the CSAR community, the Air Force launched the CRH initiative to replace its aging HH-60G fleet. This initiative provides an opportunity for the Air Force, and the joint force as a whole, to satisfactorily address the requirements of CSAR and SOF support. Acquisition of a modern, heavy-lift helicopter maximizes theater CSAR capability, while providing desperate logistic, mobility, and QRF support to SOF forces. The CRH initiative must be embraced as a catalyst to drive for organizational, doctrinal, equipment, and personnel changes. Ultimately, the disparity between requirements, resources, and capabilities of SOF and CSAR rotary-wing assets is a risk that is not likely to decrease in the future. Immediate action, through the CRH initiative, is necessary to ensure continued rotary-wing support to SOF and CSAR in the years to come.

Notes

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- ¹ *Closing the Gap: Addressing Critical Rotary Wing Shortfalls for U.S. Special Operations Forces in Fiscal Year 2011 and Beyond: Hearing before Committee on Armed Services*. 111th Cong. (2009), 5.
- ² Bill Carey, "U.S. Air Force Tries Again for Combat Rescue Helicopter," *Aviation International News* (blog), March 23, 2012, <http://www.ainonline.com/aviation-news/ain-defense-perspective/2012-03-23/us-air-force-tries-again-combat-rescue-helicopter>
- ³ *Closing the Gap*, 4.
- ⁴ Jason, L. Hanover, "Air Force Rescue: A Multirole Force for a Complex World." *Air and Space Power Journal*, XXV, no. 3 (Fall 2011): 17.
- ⁵ United States Department of Defense, *2010 Quadrennial Defense Review*. (Washington, DC: Department of Defense, 2010), 22.
- ⁶ Aaron Mehta. "3 Companies Drop Bids for USAF Combat Rescue Helicopter." *Defense News*, December 11, 2012, <http://www.defensenews.com/article/20121211/DEFREG02/312110009/3-Companies-Drop-Bids-USA-F-Combat-Rescue-Helicopter>
- ⁷ Rebecca Grant, Richard Comer, and Thomas Ehrhard, *Special Operations Forces Aviation at the Crossroads*. (Washington, DC: Center for Strategic and International Studies, 2007), vii.
- ⁸ Data compiled from various sources including United States Special Operations Command, *Budget Estimates (FY2002-FY2011)*. (Washington, DC: Office of the Undersecretary of Defense (Comptroller), 2002-2011), <http://comptroller.defense.gov/defbudget/budget>
- ⁹ Grant, vii.
- ¹⁰ "List of Aviation Accidents and Incidents in War in Afghanistan/Iraq," *Wikipedia*, last modified 15 January, 2013, http://en.wikipedia.org/wiki/List_of_aviation_accidents_and_incidents_in_the_War_in_Afghanistan
- ¹¹ Grant, 1.
- ¹² *Closing the Gap*, 4.
- ¹³ *Closing the Gap*, 13.
- ¹⁴ Darrel D. Whitcomb, *On A Steel Horse We Rode: A History of the MH-53 Pave Low Helicopters in War and Peace* (Maxwell AFB, AL: Air University Press, 2012), 607.
- ¹⁵ *Closing the Gap*, 27.
- ¹⁶ Richard Comer, "CV-22 Progress Report," *Defense Media Network*, August 6, 2012, <http://www.defensemedianetwork.com/stories/cv-22-progress-report/2/>
- ¹⁷ Comer.
- ¹⁸ Comer.
- ¹⁹ Comer.
- ²⁰ Grant, 2.
- ²¹ *US Special Operations Command Posture Statement: Presentation to the Senate Armed Services Committee*, 112th Cong., March 6, 2012.
- ²² Grant, 2.
- ²³ Grant, 4.

-
- ²⁴ Grant, 4.
- ²⁵ Association of the United States Army. "US Army Special Operations Forces," *Torchbearer National Security Report*, March 2010, 15.
- ²⁶ Doug Rombough, "SOF Rotary Wing Aircraft." *Special Operations Technology*, vol. 9, issue 7, September 2011.
- ²⁷ Michelle Tan, "Spec Ops Aviation Command Seeks 300 Pilots," *Army Times*, October 18, 2012.
- ²⁸ Strategy Page Staff. "The Great SOCOM Pilot Shortage." (blog) *Strategy Page*, November 1, 2012, <http://www.strategypage.com/htm/htsf/articles/20121101.aspx>
- ²⁹ Tan.
- ³⁰ Author's experience as MH-53M pilot, Combined Joint Special Operations Aviation Component-Iraq, 2006-2008.
- ³¹ Author's experience as Director, Joint Special Operations Aviation Component-Afghanistan, 2011.
- ³² United States Department of Defense, *2010 Quadrennial Defense Review*. (Washington, DC: Department of Defense, 2010), 22.
- ³³ *2010 Quadrennial Defense Review*, 22.
- ³⁴ United States Special Operations Command, "Special Operations Forces Truths", last modified December 1, 2012, <http://www.socom.mil/default.aspx>
- ³⁵ *Closing the Gap*, 15.
- ³⁶ "Special Operations Forces Truths"
- ³⁷ Hanover, 24.
- ³⁸ Defense Industry Daily Staff, "The USAF's New Combat Rescue Helicopter (CRH): Aiming for Affordability," *Defense Industry Daily*, December 12, 2012, <http://www.defenseindustrydaily.com/combat-rescue-helicopter-crh-07548/>
- ³⁹ *Air Force Rotorcraft Programs: Presentation to the House Armed Services Committee on Air Force Rotorcraft Programs*, 112th Cong. (2012), 3.
- ⁴⁰ Hanover, 19.
- ⁴¹ Hanover, 19.
- ⁴² David Larter. "Air Force Struggles to Keep Pave Hawks in Air," *Air Force Times*, August 20, 2011.
- ⁴³ Bruce Rolfsen, "Air Force CSAR Should Grow, Not Shrink," *Air Force Times*, September 11, 2009.
- ⁴⁴ Hanover, 19.
- ⁴⁵ Hanover, 21.
- ⁴⁶ Carey.
- ⁴⁷ Defense Industry Daily Staff, "CSAR-X...Cancelled for Convenience," *Defense Industry Daily*, June 3, 2009, <http://www.defenseindustrydaily.com/gao-re-csarx-recompete-the-contract-03082/>
- ⁴⁸ *Air Force Rotorcraft Programs*, 4.
- ⁴⁹ *Air Force Rotorcraft Programs*, 4.
- ⁵⁰ Carey.
- ⁵¹ United States Department of Defense, *2011 National Military Strategy*. (Washington, DC: Department of Defense, 2011), 18.
- ⁵² Leon Panetta, "Speech on Al-Qaeda, November 2012," *Council on Foreign Relations*, November 20, 2012, <http://www.cfr.org/defense-strategy/panettas-speech-al-qaeda-november-2012/p29547>
- ⁵³ Andrew Feickert, *U.S. Special Operations Forces: Background and Issues for Congress*. CRS Report for Congress RS21048. (Washington, DC: Congressional Research Service, June 26, 2012), 20.
- ⁵⁴ Feickert, 20.

-
- ⁵⁵ United States Department of Defense, *2012 Defense Strategic Guidance*. (Washington, DC: Department of Defense, 2012), 4.
- ⁵⁶ Feickert, 2.
- ⁵⁷ *The Future of U.S. Special Operations Forces: Ten Years After 9/11 and Twenty-five Years After Goldwater-Nichols: Hearing before House Committee on Armed Services*. 112th Cong. (2011), 1.
- ⁵⁸ Carol E. Lee, "Obama to Speed Troop Exit," *The Wall Street Journal*, January 11, 2013, <http://online.wsj.com/article/SB10001424127887324581504578235893292795864.html>
- ⁵⁹ Interview with HQ Air Force Central (AFCENT) Command Personnel Recovery officer, December 15, 2012.
- ⁶⁰ Carey.
- ⁶¹ Mehta.
- ⁶² Mehta.
- ⁶³ XBRADTC (Pseudonym). "Sikorsky Will Probably Win the Combat Rescue Helicopter Contract." (blog) *Wordpress*, December 18, 2012 <http://xbradtc.com/2012/12/18/sikorsky-will-probably-win-the-cmobat-rescue-helicopter-contract/>
- ⁶⁴ Defense Industry Daily Staff
- ⁶⁵ Mehta.
- ⁶⁶ Data compiled from various sources including website <http://www.aircraftcompare.com>
- ⁶⁷ Grant, 1.
- ⁶⁸ Richard G. Davis, *The 31 Initiatives: A Study in Air Force – Army Cooperation* (Washington, DC: Office of Air Force History, 1987), 56.
- ⁶⁹ Davis, 57
- ⁷⁰ Grant, 63.

BIBLIOGRAPHY

- Air Force News Agency, "Combat Rescue Helicopter Acquisition Process Underway," *Defence Talk*, January 30, 2012,
<http://www.defencetalk.com/combat-rescue-helicopter-acquisition-process-underway-40159/>
- Association of the United States Army. "US Army Special Operations Forces," *Torchbearer National Security Report*, March 2010.
- Carey, Bill. "U.S. Air Force Tries Again for Combat Rescue Helicopter," *Aviation International News* (blog), March 23, 2012,
<http://www.ainonline.com/aviation-news/ain-defense-perspective/2012-03-23/us-air-force-tries-again-combat-rescue-helicopter>
- Comer, Richard. "CV-22 Progress Report," *Defense Media Network*, August 6, 2012,
<http://www.defensemedianetwork.com/stories/cv-22-progress-report/2/>
- Davis, Richard G. *The 31 Initiatives: A Study in Air Force – Army Cooperation*. Washington, DC: Office of Air Force History, 1987.
- Defense Industry Daily Staff, "The USAF's New Combat Rescue Helicopter (CRH): Aiming for Affordability," *Defense Industry Daily*, December 12, 2012,
<http://www.defenseindustrydaily.com/combat-rescue-helicopter-crh-07548/>
- Defense Industry Daily Staff, "CSAR-X...Cancelled for Convenience," *Defense Industry Daily*, June 3, 2009,
<http://www.defenseindustrydaily.com/gao-re-csarx-recompete-the-contract-03082>
- DePalo, Lee. "USAF Combat Search and Rescue: Untapped Combat Power." Master's Thesis, Air War College, 2005.
- DiPaolo, Marc C., Lee DePalo, Michael Healy, Glenn Hecht, Mike Trumpfheller. "A Rescue Force for the World: Adapting Airpower to the Realities of the Long War." *Air and Space Power Journal*, XXI, no. 3 (Fall 2007):78-87.
- Feickert, Andrew. *U.S. Special Operations Forces: Background and Issues for Congress*. CRS Report for Congress RS21048. Washington, DC: Congressional Research Service, June 26, 2012.
- Giordano, Brett. "The CH-53K: Are We Purchasing the Right Amount?" Master's

Thesis, Marine Corps University, 2009.

Grant, Rebecca, Richard Comer, and Thomas Ehrhard. *Special Operations Forces Aviation at the Crossroads*. Washington, DC: Center for Strategic and International Studies, 2007.

Hanover, Jason, L. "Air Force Rescue: A Multirole Force for a Complex World." *Air and Space Power Journal*, XXV, no. 3 (Fall 2011): 16-25.

Larter, David. "Air Force Struggles to Keep Pave Hawks in Air." *Air Force Times*, August 20, 2011.

Lee, Carol E. and Adam Entous. "Obama to Speed Troop Exit." *The Wall Street Journal*, January 11, 2013,
<http://online.wsj.com/article/SB10001424127887324581504578235893292795864.html>

Looney, David A. "Current Air Force Combat Search and Rescue Challenges" Thesis, Air University, 2009.

McCall, Wes. "Naval Helicopters and SOF: How Joint Are We?" Thesis, Naval War College, 2005.

Mehta, Aaron. "3 Companies Drop Bids for USAF Combat Rescue Helicopter." *Defense News*, December 11, 2012,
<http://www.defensenews.com/article/20121211/DEFREG02/312110009/3-Companies-Drop-Bids-USAF-Combat-Rescue-Helicopter>

Panetta, Leon. "Speech on Al-Qaeda, November 2012." *Council on Foreign Relations*, November 20, 2012,
<http://www.cfr.org/defense-strategy/panettas-speech-al-qaeda-november-2012/p29547>

Parsons, Dan. "Special Operations Boost Demand for Helicopters." *National Defense* (May 2012): 46-49.

Peck, Michael. "Combat Rescue Units See Shift in Missions." *National Defense* (May 2006).

Rolfson, Bruce. "Air Force CSAR Should Grow, Not Shrink," *Air Force Times*, September 11, 2009.

Rombough, Doug. "SOF Rotary Wing Aircraft." *Special Operations Technology*, vol. 9, issue 7, September 2011.

Shanz, Marc V. "Personnel Recovery, in Need of Rescue." *Air Force Magazine*, December 2010, 28-33.

Strategy Page Staff. "The Great SOCOM Pilot Shortage." (blog) *Strategy Page*, November 1, 2012,
<http://www.strategypage.com/htm/htsf/articles/20121101.aspx>

Tan, Michelle. "Spec Ops Aviation Command Seeks 300 Pilots," *Army Times*, October 18, 2012.

Ulshoffer, Lisa, Andrew Young, William Nivison, Dean George. "AFSOC Logistics: Quiet Professionals Supporting the War Fighter." *Air and Space Power Journal*, XIX, no. 1 (Spring 2005).

United States Department of Defense. *2006 Quadrennial Defense Review*. Washington, DC: Department of Defense, 2006.

United States Department of Defense. *2010 Quadrennial Defense Review*. Washington, DC: Department of Defense, 2010.

United States Department of Defense. *2011 National Military Strategy*. Washington, DC: Department of Defense, 2011.

United States Department of Defense. *2012 Defense Strategic Guidance*. Washington, DC: Department of Defense, 2012.

United States Federal Business Opportunities, *Combat Rescue Helicopter Pre-solicitation Notice*. Washington, DC: Federal Business Opportunities, 2012.
https://www.fbo.gov/index?s=opportunity&mode=form&id=84e54f4711c89e17e8ff93576d5578fd&tab=core&_cview=1

United States Special Operations Command, *Budget Estimates (FY2002-FY2011)*. Office of the Undersecretary of Defense (Comptroller), 2002-2011.
<http://comptroller.defense.gov/defbudget/budget>

United States Special Operations Command, *Special Operations Forces Truths*, last modified December 1, 2012, <http://www.socom.mil/default.aspx>

United States Special Operations Command. *Special Operations Command Fact Book 2013*. USSOCOM Public Affairs, 2013.

Warwick, Graham. "The USAF's New Combat Rescue Helicopter (CRH): Aiming for

Affordability,” *Aviation Week* (blog), Oct 23, 2012,
<http://www.aviationweek.com/>

Whitcomb, Darrel D. *On A Steel Horse We Rode: A History of the MH-53 Pave Low Helicopters in War and Peace*. Maxwell AFB, AL: Air University Press, 2012.

U.S. Congress. House. *Presentation to the House Armed Services Committee on Air Force Tactical Aviation Programs*, 111th Cong., March 2011.

U.S. Congress. House. *Presentation to the House Armed Services Committee on Air Force Rotorcraft Programs*, 112th Cong., March 2012.

U.S. Congress. House. *Closing the Gap: Addressing Critical Rotary Wing Shortfalls for U.S. Special Operations Forces in Fiscal Year 2011 and Beyond. Hearing before Committee on Armed Services*. 111th Cong., 2009.

U.S. Congress. House. *The Future of U.S. Special Operations Forces: Ten Years After 9/11 and Twenty-five Years After Goldwater-Nichols. Hearing before Committee on Armed Services*. 112th Cong., 2011.

U.S. Congress. Senate. *Presentation to the Senate Armed Services Committee on US Special Operations Command Posture*, 112th Cong., March 2012.

XBRADTC (Pseudonym). “Sikorsky Will Probably Win the Combat Rescue Helicopter Contract.” (blog) *Wordpress*, December 18, 2012
<http://xbradtc.com/2012/12/18/sikorsky-will-probably-win-the-cmobat-rescue-helicopter-contract/>