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## *Preface*

This paper is a study of some of the current roles and missions of the Marine Corps KC-130. I will examine the historical employment and the various shifts or changes that led the KC-130 community to where it is today. Further, my intent is to make recommendations for future additions to employment based on the current environment and operational requirements.

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## **Executive Summary**

**Title:** The Ever Changing Role of the KC-130

**Author:** Major Keith S. Oki, United States Marine Corps

**Thesis:** The introduction of the more capable KC-130J, coupled with the specific needs of the operational forces today, requires the community and the Marine Corps to develop an armed Marine KC-130.

**Discussion:** Marine Corps Aviation exists to support the Marine on the ground. Today, in both Operation Iraqi Freedom and Operations Enduring Freedom, the Marine on the ground continues to make a plea for increased support in the areas of fires and intelligence, surveillance, and reconnaissance (ISR). Serious discussions and proposals of the Marine KC-130 potentially fulfilling these shortfalls date back to at least as early as 2001. With the continued development of technology, as well as the component type nature of the KC-130J, the capability now exists to exploit this opportunity. Conceptually, an armed KC-130 has the ability to provide persistent ISR and fire support.

**Conclusion:** In order to meet the needs of the Marine on the ground, the KC-130J should be modified to fulfill an ISR role as well as provide an offensive fires capability.

## **INTRODUCTION**

Since its introduction in the 1960s, the Marine KC-130 has served as an invaluable asset to the Marine Air-Ground Task Force (MAGTF) and continues in that capacity today. Although the Marine Corps initially acquired the platform to satisfy the air-to-air refueling requirements of tactical, fixed-wing aircraft, its current employment encompasses a much wider range of missions. This range of missions has increased over time, in response to the expanding needs of the commander and the Marine on the ground. Within the current primary mission of assault support, the primary task of the KC-130 is air-to-air refueling with assault air transport as its secondary task.<sup>1</sup>

By looking through the lens of history, over decades of experience, one can see the iterative advances in tactics, techniques, and technology that have developed into the current role of the KC-130. The needs of the warfighter today, driven by an increasingly complex environment, calls for the KC-130 to continue these advances. A unique set of circumstances provide the Marine Corps and the KC-130 community the opportunity to acquire a capability not organically available with a single platform. This capability is persistent and precise Intelligence, Surveillance, and Reconnaissance (ISR) and aviation fire support.

## **ACQUIRING THE KC-130**

The Lockheed C-130 has been in production for over 50 years. The aircraft is operated in more than 60 nations, and in more than 70 military and commercial versions.<sup>2</sup> The aircraft got its start in the Marine Corps in the late 1950s. In the years leading up to 1960, the Marine Corps relied on the aging R4Q-1/2 and the R5D for its heavy-lift transport aircraft.<sup>3</sup> Despite having a significant number of these aircraft available, the Marine Corps had a desire for a more capable airframe. Specific areas where leaders sought improvement

were range, speed, and payload. They wanted an airframe designed with military transport in mind, versus a commercial airliner adapted for military use.

In a 1955 hearing conducted by the Secretary of Defense and the Joint Chiefs, LtCol Perry L. Shuman, an F-4 Ace from World War II, made a convincing argument for the Marine Corps' bid to acquire the C-130. His argument focused on the immediate and long-range air movement of both ground and air units that were essential to the vitality of the Marine Corps. Although adopting the C-130 would certainly provide a greater capability to the Marine Corps, it was not perceived to conflict with the long-range jet initiatives of the Air Force. It was under that premise that Shuman argued for "a Marine aircraft that could, on short notice, both transport the Marine ground force-in-readiness and refuel their supporting aircraft en route to a trouble area."<sup>4</sup>

Supporting this plea for transport and air-to-air refueling were the Marine Corps' experiences in World War II. The further operations in the Pacific theater extended, the more important rapid transport became. Intratheater transport of personnel, equipment, and cargo relied more and more on aviation. "Marine air transport flew personnel and critical materials from the United States to Fleet Marine Force units throughout the Pacific Ocean. Marine transport aircraft had proven themselves as logistic support vehicles, but their use as tactical transport vehicles had not yet been fully explored."<sup>5</sup>

After tremendous efforts in meeting the operational requirement, development characteristic, flight testing, and obtaining funding, the first Marine KC-130 was delivered to VMR-352 in March of 1960. In that first year, the procedures for in-flight refueling were developed and tested. By late 1961, the first four KC-130s were operational in the 1st Marine

Aircraft Wing.<sup>6</sup> After the initial order, Lockheed in Marietta, Georgia, built forty-six KC-130s and completed deliveries to the fleet in November of 1962.<sup>7</sup>

### **AIR-TO-AIR REFUELING AS THE PRIMARY TASK**

Just twenty months after receiving its first KC-130, the Marine Corps demonstrated its newly acquired organic ability to support long-range deployments of its fighter squadrons. In January of 1962, 18 F8U-2N Crusaders of VMF(AW)-451 departed from El Toro, California and arrived in Atsugi, Japan. The trans-pacific flight made overnight stops in Kaneohe Bay, Hawaii, Wake Island, and Guam. In October of the same year, "sixteen A-4C Skyhawks of VMA-225 completed a two-way crossing of the Atlantic between Cherry Point, North Carolina, and Rota, Spain, via Bermuda."<sup>8</sup> As commitments in Vietnam escalated, so too did the Marine Corps' involvement. Air-to-air refueling provided by the fleet of KC-130s facilitated the deployments of several Marine fighter and attack squadrons to Southeast Asia, and later, in 1969 and the early 1970s, their redeployment.<sup>9</sup> The role of the KC-130 as an air-to-air refueler, the mission that secured its acquisition, had been validated.

### **VIETNAM SETS THE STAGE**

When the war in Vietnam began, the KC-130s of Marine Aerial Refueler Transport Squadron 152 were based in Iwakuni, Japan. By late 1965, the squadron had moved south to the island of Okinawa to facilitate more efficient support. It had also forward deployed a detachment of four KC-130s to Da Nang.<sup>10</sup> From Da Nang, the detachment was able to provide logistical support to Marines throughout the country. It supplied air-landed men and equipment to bases with suitable landing fields, and executed air drops to those that did not. Air-to-air refueling was also provided to Marine jets operating in the north. Although not as



frequent as the logistical and air-to-air refueling flights, the detachment also provided Direct Air Support Centers (Airborne) (DASC[A]), and battlefield illumination flights.<sup>11</sup>

Perhaps the most storied involvement of Marine KC-130s in Vietnam occurred in support of units from the 3rd Marine Division at Khe Sanh Combat Base. As part of the Tet Offensive that started in January of 1968, the People's Army of Vietnam attempted to lay siege to the combat base and cut off the ground supply routes. Over the next seventy days, the KC-130s from 1st Marine Aircraft Wing executed air-land and air-drop operations and delivered more than 4,600 tons of cargo to the combat base.<sup>12</sup>

On February 10, 1968, aircraft 149813, a KC-130 from VMGR 152, departed Da Nang on a logistics flight carrying six JP-4 fuel bladders and two pallets of cargo. On its final approach for landing at Khe Sanh, the aircraft was struck with numerous rounds of enemy anti-aircraft fire in the cockpit and in the cargo compartment. Prior to landing, the crew reported that one of the fuel bladders had been hit and started a fire in the cargo compartment. On landing, an explosion was observed on the right side of the aircraft, followed by another explosion on the right side of the aircraft as it proceeded down the runway toward the tower. The aircraft finally came to rest 3,100 feet from the approach end of the runway where a third explosion occurred in the cargo compartment engulfing the aircraft in flames. The incident resulted in fatal injuries to two crew members, four passengers, and a loss of the aircraft.<sup>13</sup>

Following this tragic event, and after incurring significant anti-aircraft and small arms damage to their own aircraft, the commander of the Seventh Air Force prohibited further landings at Khe Sanh by Air Force C-130s. Air Force C-123s and Marine KC-130s continued to land when weather conditions and lulls in enemy fire permitted. General William Momyer,

USAF, cited the "overall value of C-130s to the national defense and the airplane's potential value in future conflicts," as the reason for halting the Air Force C-130 landings.<sup>14</sup>

### **HELICOPTER AIR-TO-AIR REFUELING**

The Marine KC-130 is the only aircraft in the U. S. inventory capable of refueling fixed wing and tilt-rotor aircraft as well as helicopters.<sup>15</sup> As of June of 2005, Marine KC-130s make up over 50 percent of the Department of Defense's rotary wing air-to-air refueling capable aircraft.<sup>16</sup> The first successful testing of the conventional probe and drogue system used to refuel a helicopter occurred in December of 1965 when a modified Air Force CH-3 successfully plugged into a Marine KC-130 refueling basket over the skies of Cherry Point, North Carolina.<sup>17</sup> Over the years of its employment, the KC-130 has proven its value as a helicopter air-to-air refueler; however, the Marine Corps would not feel significant impact until the CH-53E helicopter and its refueling probe were introduced in 1981.

Just prior to the official beginning of Desert Storm, the 4th Marine Expeditionary Brigade received the call to evacuate the noncombatants from the American Embassy in Mogadishu, Somalia. On the night of January 5, 1991, two KC-130s departed from Bahrain and rendezvoused with two CH-53s from the 4th MEB before dawn. This occurred while the helicopters were still 460 miles off the coast of Somalia.<sup>18</sup> After three in-flight refueling evolutions, the two CH-53s returned to the USS Guam with sixty-one evacuees. Over a twenty-four hour period, the operation known as Eastern Exit resulted in the safe evacuation of over 400 U.S. and foreign citizens.<sup>19</sup> The success of this operation solidified the value of the KC-130 in helicopter air-to-air refueling and increased the awareness of future potential KC-130 employment.

## **DESERT STORM FURTHER DEFINES AIR-TO-AIR REFUELING**

The beginning of August 1990 was marked by the Iraqi invasion of Kuwait, and the seizure of Kuwait City. Three days after the invasion, the President of the United States publicly declared the attack as an act of naked aggression and demanded the immediate and unconditional withdrawal of Iraqi forces from Kuwait. Over the next four and a half months, the Persian Gulf experienced the build up of the 3rd Marine Aircraft Wing, and a total of twenty Marine KC-130s.<sup>20</sup> Despite previous use of the KC-130 to support transoceanic deployments, Marine fighter and attack aircraft relied solely on Air Force tankers to cross the Atlantic. In the largest Marine Corps deployment since Vietnam, Marine KC-130s were used exclusively as logistic transports.<sup>21</sup>

Just prior to the transition to Desert Storm in late November of 1990, the Marines of the 3d Marine Aircraft Wing quickly developed an appreciation for the presence of Marine KC-130s in the Persian Gulf. After completing a predawn combat air patrol mission in the northern Gulf, four Marine Hornets found their destination airfield covered by an early morning fog that had blanketed the entire coast. Without a viable alternate airfield, and with all the tankers grounded by the dense fog, the Marine KC-130s were called upon to assist. A senior crew composed of volunteers departed in zero visibility weather from the officially closed Bahrain International Airport. Once safely airborne, the Hornets cycled through the KC-130 for fuel and all five aircraft eventually landed in Bahrain. This was the first of multiple low fuel situations that Marine KC-130s were able to provide assistance during Desert Shield and Desert Storm.<sup>22</sup>

During the execution of Desert Storm, the primary focus of Marine KC-130s was tactical air-to-air refueling of fixed wing assets. Refueling tracks in support of road

reconnaissance and close air support, located behind the forward edge of the battle area, were maintained twenty-four hours a day.<sup>23</sup> Other missions flown in support of Desert Storm included air-land and air-drop of personnel and cargo as well as twenty-four hours a day DASC(A).<sup>24</sup> Although KC-130 employment during Desert Storm was successful, senior members of the community were quick to point out that the versatility of the aircraft could have been further exploited if it were not limited by the lack of night vision device (NVD) equipment.<sup>25</sup> "Marine KC-130s transported 8.1 million pounds of cargo and 3038 troops; they also refueled 3,448 aircraft in flight with 21.4 million pounds of fuel."<sup>26</sup>

### **LACKING A CAPABILITY**

In July of 1993, after the completion of Desert Storm, the Marine Corps Master Plan (MCMP) 1994-2004 identified the capability to fight at night as a priority. The KC-130 community openly acknowledged the validity of this capability in 1994, and cited a 1990 Marine Corps Lessons Learned report of a KC-130 squadron commander:

My deep and abiding frustration comes from the realization that our present taskings and the system for tasking our aircraft will not allow us to safely gain and maintain the skills necessary for night operational capability. While the use of night vision devices aboard the KC-130 is clearly feasible, the question that must be answered is whether the night operations capability is worth the dedicated training required to gain and maintain these highly perishable skills. I, for one, think that it is, but it will require a commitment of assets and training time not yet achieved in this community.<sup>27</sup>

It was not until 2002, following the loss of seven crewmembers and aircraft 160021 in Pakistan during Operation Enduring Freedom, that the appropriate assets and training were allocated to fighting at night.

## **OPERATION ENDURING FREEDOM (OEF)<sup>28</sup>**

In September and October of 2001, six Marine KC-130s deployed to Bahrain, and later to Pakistan, in support of Operation Enduring Freedom. For the next five months, these KC-130s took to the skies every night in support of the 15th and 26th MEU(SOC)s and Task Force (TF) 58. These sorties were in direct support of the MAGTF but the types of missions flown were quite different from what was experienced during Desert Storm. Although all of the sorties were classified as assault support, very few of them were air-to-air refueling missions. Over 95 percent of KC-130 sorties executed during this period were air logistical support missions flown during the hours of darkness. Assets of the TF were air-landed at expeditionary airfields in Pakistan and Afghanistan. These missions delivered fuel, ordnance, food, water, and other critical supplies to Forward Arming and Refueling Point (FARP) sites and were critical in establishing combat power ashore and supporting the TFs prosecution of combat over 300 miles inland.

Although this period of the operation is widely recognized by the Marine Corps for its success and innovation in MAGTF employment, perhaps the greatest outcome was a direct impact on the KC-130 community. As mentioned, the vast majority of KC-130 sorties flown in support of TF 58 were conducted at night, however, none of the aircraft were equipped with night vision lighting (NVL), nor were any of the crews trained or qualified to use such equipment. Flying at night was an operational decision that assumed certain risk, but it was determined that the threat of small arms and man-portable air defense systems posed a greater and more likely risk. Crews flew with all exterior lighting extinguished and refrained from activating aircraft landing lights until landing was assured, on short final, approximately 150 feet above the ground.

On January 9, 2002, aircraft 160021 from VMGR-352 crashed and caught fire in the mountains surrounding the airport in Shamsi, Pakistan while it was on its final approach.<sup>29</sup> While it will never be determined whether or not NVL equipment could have definitively prevented this incident, it is accepted that such equipment would have drastically improved the crew's situational awareness. Currently, all aircraft in active duty squadrons are NVL equipped.

#### **OPERATION IRAQI FREEDOM (OIF)<sup>30</sup>**

Twelve years after the expulsion of Iraq from Kuwait, the United States once more found itself at odds with Saddam Hussein. Fearing the possession and potential proliferation of weapons of mass destruction, and with the continuing struggle in the Global War On Terror, the Marine Corps and the KC-130 again deployed to Bahrain in support of combat operations. From January to March of 2003, a total of twenty-four aircraft, from one active squadron and two reserve squadrons, gathered for the largest detachment of KC-130s in the aircraft's forty-year history.

By March 20, 2003, the day the invasion of Iraq began, Marine KC-130s were providing fixed wing air-to-air refueling twenty-four hours a day. This coverage provided over three quarters of a million pounds of airborne fuel for Marine F/A-18 Hornets and AV-8B Harriers. This degree of continued refueling support was maintained for the next six weeks. In a period of approximately forty days, Marine KC-130s offloaded over twenty-five million pounds of fuel in support of air-to-air refueling missions.

Another assault support mission executed during this operation was the air logistical support of I Marine Expeditionary Force's march to Baghdad. These assault support missions, included in the initial planning, contributed to the establishment of forward

operating bases (FOBs) and forward arming and refueling points (FARPs). Pivotal in maintaining the tempo and pace for the ground scheme of maneuver, these FOBs and FARPs provided resupply of food, fuel, ordnance, and water.

As in OEF, the enemy threat level drove flights conducting air-land operations north of the Kuwait-Iraq border to be executed during the hours of darkness. This time, however, the assault support aircraft were properly equipped with aircraft survivability equipment and NVL, and the crews were appropriately trained and proficient. In order to take full advantage of the night and minimize wasted crew day enroute to and from Bahrain, four KC-130s operated out of Joe Foss Field, an expeditionary airfield just south of the Kuwait-Iraq border. These aircraft flew six to twelve sorties each night and, over the six-week period, delivered more than five million pounds of cargo.

Perhaps the least glamorous mission for the KC-130 during OIF, but one of the most crucial, was DASC(A). As alluded to earlier, the distance covered by the Ground Combat Element (GCE), as well as the pace at which they accomplished it, exceeded the line of sight capability of the DASC and reduced the ability to effectively command and control air operations. The solution was twenty-four hour a day DASC(A) provided by Marine Air Support Squadron (MASS) and the KC-130. The detachment configured four KC-130s with the AN-UYQ-3A communications van and flew eleven to thirteen hour sorties, including transit time, in order to maintain constant coverage for command and control.

#### **A NEW, MORE CAPABLE AIRFRAME**

In FY96, the Air Force began procurement of the C-130J to replace the C-130E and the C-130H. As part of a congressional mandate, the Marine Corps was directed to replace its aging KC-130 fleet with the KC-130J. Lockheed Martin delivered the first aircraft to the

replacement squadron in 2000.<sup>31</sup> In January of 2003, after successful maintenance training in the replacement squadron and extensive flight-testing at the test and evaluation squadron in Patuxent River, MD, the Marine Corps transferred the first KC-130J to VMGR 252.<sup>32</sup>

The first combat deployment for the Marine KC-130J began in February 2005. VMGR 252 based six aircraft at Al Asad, Iraq with the Second Marine Aircraft Wing. The squadron averaged between 500 and 600 hours a month, and flew more than 6,300 hours for the year, in continued support of Operation Iraqi Freedom. During the yearlong deployment, the squadron delivered more than eight million pounds of cargo, and passed more than thirty million pounds of fuel in air-to-air refueling operations.<sup>33</sup>

## **THE ENVIRONMENT WE FACE TODAY**

Over its history, the United States has been involved in numerous armed conflicts. Some of these conflicts are appropriately characterized as conventional war. It is these types of conflicts that people can most easily identify – the Revolutionary War, the Civil War, World War I and World War II. These conventional wars were fought between states, in an open confrontation between their militaries.

It is now 2009 and the United States is involved in another armed conflict. This conflict is known around the world as the Global War on Terror. Despite the use of the word “war” in the title of this conflict, its character is very different from the four previously mentioned. Although the United States and her Allies’ initial retaliation for the events of September 11, 2001 can be characterized as conventional, the conflict we are involved in today cannot be. The United States is not at war with Afghanistan or Iraq, or any other state. These two states are merely the fields on which the battle is being fought. The United States is involved in an irregular conflict against insurgents and terrorists. Although the exact



terminology used to identify the nature of today's conflict is still heavily debated, most, if not all, will agree that it is not the conventional fight most are accustomed to.

As a fighting force in the United States military, the Marine Corps is heavily involved in the Global War on Terror. Over the last seven years, the tactics, techniques, and procedures of those fighting in this conflict have adapted to counter the irregular, insurgent threat. Marine Forces on the ground have adopted concepts such as Distributed Operations or Enhanced Company Operations in an attempt to be more effective. Although these concepts may not be fully employed, it is evident that they can be effective even if utilized to a lesser degree. As expressed by the Commandant, General Conway, the battalion has historically been the smallest tactical formation capable of sustained independent operations. However, in current operations, it is the company performing these independent operations.<sup>34</sup>

In order to continue to support the Marines on the ground in this effort, it requires other elements of the Marine Corps to develop as well (enhance, improve, modify). Two specific areas where the Marine Corps has identified shortfalls in past operations are aviation fire support and ISR. Marine Corps aviation exists to support the Marine on the ground, and one platform that is potentially capable of lessening these short falls is the Marine KC-130.

Serious discussions and proposals of the Marine KC-130 aircraft potentially fulfilling these shortfalls date back to at least as early as 2001. With the continued development in technology, as well as the component type nature of the KC-130J, the capability to exploit this opportunity now exists. The introduction of the more capable KC-130J, coupled with the specific needs of the operational forces today, requires the community and the Marine Corps to develop an armed Marine KC-130. Conceptually, an armed KC-130 has the ability to provide persistent ISR and fire support. In order to meet the needs of the Marine on the

ground, the KC-130J should be modified to fulfill an ISR role as well as provide an offensive fires capability.

## **THE NEEDS OF THE WARFIGHTER**

In July of 2008, U.S. Marine Corps Forces Central Command, submitted an Urgent Universal Need Statement (UUNS) to the Deputy Commandant for Combat Development and Integration (DC CD&I). This UUNS outlined the exceptional requirement for an additional warfighting capability that was critically required for conducting combat operations in Iraq and Afghanistan. The statement argued that MAGTF operations in Iraq and Afghanistan continued to have a never-ending aviation support requirement for persistent and precise fires and ISR, and referred to comparable capabilities present with the Air Force AC-130.<sup>35</sup>

The AC-130 is now part of the Special Operations Command and considered a high-demand, low density asset. Despite the fact that these aircraft are currently deployed in support of Central Command, Marines that found themselves in situations where they could have benefited from its employment did not receive support due to lack of assets and higher priorities. The UUNS makes the case that procurement of such an organic capability would increase the overall combat effectiveness of the MAGTF due to the improved capability of Marine aviation to support forces on the ground. According to the document, failure to deliver such a capability was likely to result in the inability of units to accomplish their missions or risk increased probability of casualties and loss of life.

## **ADAPT TO STAY RELEVANT**

In 1994, individuals from the Marine KC-130 community recognized shortfalls, and called for future development in KC-130 capabilities to create an integrated MAGTF to provide the commander with a force multiplier and enhanced operational flexibility.<sup>36</sup> This

specific instance focused on the task of battlefield illumination, and argued that the KC-130 has the endurance and all-weather capability to "provide an alternative to the MAGTF commander, while conserving other limited battle-field illumination assets."<sup>37</sup>

Since the KC-130 was first acquired in 1960, it has proved to be flexible enough to be modified and continues to fill the Marine Corps' ever changing missions. The same argument used in 1994 that advocated the use of Marine KC-130s for battlefield illumination could also be made today. The opportunity exists to capitalize on the flexible capabilities inherent with the KC-130J while incorporating state-of-the-art technology, which is off the shelf and essentially low risk. This could dramatically increase the support available to the Marine on the ground.

#### **EMPLOYING AN ARMED KC-130J**

Fulfilling the current requirements for aviation ISR and fire support is challenging, if not impossible, for the Marine Corps due to the nature of the terrain, the size of areas of operations assigned to MAGTFs, and the requirement for persistent coverage. In order to fill the current gap, the Marine Corps needs to procure and employ an ISR/Weapon mission kit for use on the KC-130J. Employment of such a mission kit on the KC-130J would serve as a tertiary task for the aircraft and improve the support available from organic aviation assets.<sup>38</sup>

Aircraft configured with the mission kit would specifically address the issues outlined in the 2008 UUNS and provide extended-duration ISR and persistent and precise aviation fires. Appropriately configured aircraft would perform an ISR/close air support (CAS) mission from a defensive over-watch perspective. This ability "to provide suppressive area fires and low-magnitude precision fires could be effectively employed to counter enemy ambush operations and provide covering fires in mountainous terrain."<sup>39</sup>

Equipping the KC-130J for this tertiary set of missions is the quickest and most efficient means of satisfying the requirements delineated in the UUNS. The proposed mission kit would be comprised of equipment currently used in the employment or development of other military weapons systems. This equipment would be integrated into a palletized "roll-on/roll-off" kit that could be installed or removed in a matter of hours. The objective of procuring such a system would be to meet the needs of the warfighter without compromising current capabilities and requirements. Although cargo capacity would be reduced in aircraft configured with the mission kit, the mission kit would not preclude the aircraft and crew from conducting its primary mission of air-to-air refueling.<sup>40</sup>

The systems under consideration for integration into the mission kit would provide for two different forms of defensive fires. One form of defensive fires is area suppression with a high volume of fire. To provide this suppressive area fire, a 30mm cannon, coupled to a fire control system and target sight system, could be employed out one of the aft paratroop doors of the KC-130J. The other form of defensive fires is low-magnitude precision fires from laser-guided rockets or standoff precision guided munitions (SOPGMs). Laser-guided rockets have been successfully launched from C-130s and could be mounted under the wing to prosecute armored targets. SOPGMs could be loaded in the cargo compartment of the aircraft and be employed from altitudes as high as 25,000 feet. One of the main benefits of current SOPGMs is that they are considered low yield munitions and could be effectively employed in the urban environment.<sup>41</sup>

Perhaps the most critical component of the mission kit would be the targeting system.

The targeting system would be used to identify and track targets, and when combined with positional data from the aircraft, compute firing solutions. Such a system would be equivalent

to those currently in use on other aviation weapon systems and provide video datalink through Rover and Video Scout. Similar to the current configuration of the USAF Shadow Harvest C-130, the sensor for the targeting system could be mounted under one of the external fuel tanks.<sup>42</sup>

While acquiring a mission kit for the KC-130J would provide a significant improvement to the capabilities of Marine aviation, limitations for its employment must be considered. Despite the incorporation of a credible aircraft survivability equipment suite, the KC-130J is not designed for attack or aerial reconnaissance missions. Operations conducted at low to medium altitudes would significantly increase exposure to enemy air defense weapons. The relatively slow operating speeds, limited maneuverability, and large signature make the aircraft vulnerable to ground-based infrared and radar-guided weapons. Therefore, KC-130J operations, including those involving a mission kit, should remain limited to low-threat, permissive environments.<sup>43</sup>

## **OPENING THE DOOR FOR FUTURE CHANGE**

The introduction of the KC-130J, and the decision to transition both the active duty and reserve fleets, has paved the way for the Marine Corps to continue to develop the employment of this aircraft. Major system improvements in the flight station, such as fully integrated digital avionics, state of the art navigation systems, and fully integrated defensive systems, have reduced the manpower requirement in the cockpit. Despite this reduction in crew, the information available and its presentation have dramatically increased the crew's situational awareness.<sup>44</sup>

The KC-130J also capitalizes on a modern, more efficient power plant system. When compared to older C-130s, the new turboprop engines with six-bladed, composite propellers

allow the KC-130J to climb faster and higher, and thus fly farther at a higher cruise speed. These improvements will directly result in lower operating costs. As with these state of the art engines, improved fuel, environmental, and structural systems have the ability to report any discrepant condition to the maintainer via a computer download. This capability will result in lower support costs.<sup>45</sup>

Perhaps the area with the most significant opportunity to produce a cost savings is in the realm of pilot training. Accompanying these new aircraft is a modern weapons systems trainer. The Marine Corps has installed three full-motion flight simulators in the active duty squadrons at MCAS Okinawa, MCAS Miramar, and MCAS Cherry Point. Each squadron's training department has incorporated these simulators in their pilot training syllabus. Since these simulators "are built to the Federal Aviation Administration's Level D performance requirements – the highest fidelity standards established for the commercial aviation industry," the Marine Corps is able to take advantage of similar commercial practices and qualify aircrew in the simulator at a much lower cost per student.<sup>46</sup> The quality of these new simulators also allows the aircrew to maintain tactical proficiency in missions that historically could only be updated in the aircraft.

## **VISION FOR CONTINUED EMPLOYMENT**

The KC-130 exists to support the MAGTF, and thus, the primary focus of employment should be for the support of the Marine Expeditionary Unit – Special Operations Capable, or MEU (SOC). These MEU(SOC)s are responsible for the requirements established by the National Command Authority and Geographic Combatant Commanders. They provide a versatile, forward presence with the operational flexibility to respond quickly to a variety of missions. These units have the ability to rapidly deploy throughout the world,

and thus provide combatant commanders a viable force that can efficiently execute missions that range from full-scale combat to noncombatant evacuation operations.<sup>47</sup>

According to a RAND study published in 2002, one of the most critical phases of a conflict is associated with the early stages of the buildup of forces. During this period, U.S. forces are likely to be outnumbered, and could even be on the defensive. It is precisely this time that requires heavy close air support.<sup>48</sup> The study goes on to document that the requirement for close air support usually exceeds that which is available. This is due to the finite number of assets available, as well as their allocation in light of the overall operational situation.<sup>49</sup> Since numerous mission essential tasks (METs) of the MEU involve seizing and securing terrain or facilities to receive or enable the introduction of follow-on forces, a mission the Marine Corps is known for, it is likely to be called upon in such an instance.<sup>50</sup>

Currently, the Marine Corps assigns a detachment of two KC-130s to each MEU (SOC). These detachments are required to provide "refueling services for embarked helicopters, AV-8B aircraft, and perform other support tasks (e.g., parachute operations, flare drops, cargo transportation, etc.) as required."<sup>51</sup> Currently, these aircraft are able to provide long-range, night vision capable assault support to the MEU. Within the limits of technology available today, the KC-130J is also capable of providing the persistent and precise CAS and ISR warfighters are requesting.

## **CONCLUSION**

The concern regarding acquisitions and training being based on current operations, and losing sight of conventional warfare and the conflicts of tomorrow, is a valid one. The battle being fought in Iraq is quickly coming to a close and, although it is not likely, it is possible that the same could happen in Afghanistan. Despite the achievements and

accomplishments in these two countries, the concept of counterinsurgency is enduring, and continued advances in equipment and training utilized to defeat those who employ such tactics must be pursued.

The acquisition and employment of the proposed KC-130J ISR/weapon mission kit falls in line with these required advances. Thus far, the discussion of the mission kit has focused on environments associated with irregular warfare but its application could obviously extend much further. Physical limitations notwithstanding, the missions of the KC-130 are only limited by the vision of the commander and the ingenuity of the crew. Just as it has in the past, the KC-130 and the Marine Corps must continue to adapt and overcome in order to maintain their status as one of the world's premier fighting forces.



## ENDNOTES

- <sup>1</sup> Headquarters U. S. Marine Corps, *Aviation Operations*, MCWP 3-2 (Washington, DC: U.S. Marine Corps, May 9, 2000), 2-10.
- <sup>2</sup> Daniel Bahneman, "C-130J Training Advances: Devices and training support improvements," *Marine Corps Gazette* 90, no. 9 (September 2006): 29.
- <sup>3</sup> "The Flying Leatherneck," Historical Foundation and Aviation Museum, Marine Corps Air Station Miramar, San Diego, CA. <http://www.flyingleathernecks.org/transport.html> (accessed on February 17, 2009).
- <sup>4</sup> Col John B. Berteling, USMC(Ret), "The C-130 and the Corps – The Early Years," *Marine Corps Gazette* 78, no. 5 (May 1994), 27.
- <sup>5</sup> Headquarters U. S. Marine Corps, *Assault Support*, MCWP 3-24 (Washington, DC: U.S. Marine Corps, August 2, 1999), 1-1.
- <sup>6</sup> Berteling, 30.
- <sup>7</sup> Paul St. John Turner, *Aircraft Profile* (Windsor, Berkshire, England: Profile Publications Limited, 1971), 19.
- <sup>8</sup> Brian Gardner, "When You Need A Buddy: Aerial Refueling in the US Navy," *The Hook* 11, no. 3 (Fall 1983): 21.
- <sup>9</sup> LtCol Dwight C. Neeley, USMC, "Evolution of the USMC KC-130 Primary Mission," (master's thesis, Marine Corps University, 2004), 5-6.
- <sup>10</sup> Peter B. Mersky, *U.S. Marine Corps Aviation: 1912 to the Present* (Baltimore, MD: The Nautical & Aviation Publishing Company of America, Inc., 1997), 216.
- <sup>11</sup> Headquarters, U.S. Marine Corps, *The Marines in Vietnam, 1954-1973: An Anthology and Annotated Bibliography* (Washington, DC: History and Museums Division, 1985), 281.
- <sup>12</sup> Captain Moyars S. Shore, *The Battle for Khe Sanh* (Washington, DC: U.S. Marine Corps Historical Branch, 1969), 79.
- <sup>13</sup> "Command Chronology for the period 1 February through 29 February 1968," 1968, VMGR 152, United States Marine Corps History Division, Historical Reference Branch, Quantico, VA. VMGR-152 Collection.
- <sup>14</sup> Sam McGowan, *The C-130 Hercules: Tactical Airlift Missions, 1956-1975* (Blue Ridge Summit, PA: Tab Books Inc., 1988), 165.
- <sup>15</sup> Michael W. Broadway, "The Marine KC-130: Evolution of a Warrior," *Marine Corps Gazette* 78, no. 5 (May 1994), 22.
- <sup>16</sup> John Pike, "KC-130," *Global Security*, June 15, 2005, <http://www.globalsecurity.org/military/systems/aircraft/kc-130.htm> (accessed on February 13, 2009).
- <sup>17</sup> Bill Bongiorno, "Squadron cited for 25 years of accident-free service," *News-Times*, May 11, 1984.
- <sup>18</sup> Mersky, 309.
- <sup>19</sup> "VMGR-252 Lessons Learned for Operation Desert Shield/Desert Storm," May 16, 1991, VMGR 252, United States Marine Corps History Division, Historical Reference Branch, Quantico, VA. VMGR-252 Collection.
- <sup>20</sup> LtCol LeRoy D. Stearns, USMC, *U.S. Marines in the Persian Gulf, 1990-1991: The 3d Marine Aircraft Wing in Desert Shield and Desert Storm* (Washington, D.C: History and Museums Division, 1999), Appendix F.
- <sup>21</sup> Stearns, 24.
- <sup>22</sup> Stearns, 74.
- <sup>23</sup> VMGR-252.
- <sup>24</sup> Stearns, 113.
- <sup>25</sup> VMGR-252.
- <sup>26</sup> Broadway, 23.
- <sup>27</sup> Capt Kenneth W. Clark, USMC, "The Forgotten Asset: Marine KC-130s," *Marine Corps Gazette* 78, no. 5 (May 1994), 40.
- <sup>28</sup> Information is derived from author's personal experiences as a pilot on the OEF detachment.
- <sup>29</sup> Flight Safety Foundation, "ASN Aircraft accident Lockheed KC-130R Hercules 160021 Shamsi," *Aviation Safety Network*, April 18, 2006, <http://aviation-safety.net/database/record.php?id=20020109-0> (accessed on February 13, 2009).

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<sup>30</sup> Information is derived from the author's person experiences as the KC-130 planner on the staff of 3rd Marine Aircraft Wing's Tactical Air Command Center from March 2003 to October 2003.

<sup>31</sup> John Pike, "KC-130J," *Global Security*, June 15, 2005, <http://www.globalsecurity.org/military/systems/aircraft/kc-130J.htm> (accessed on February 13, 2009).

<sup>32</sup> Rick Llinares, "KC-130J: New Hercules for the Marines." *Naval Aviation News* 86, no. 1 (November-December 2003), 32.

<sup>33</sup> James Hamel, Cpl, USMC, "Operation Iraqi Freedom Moves Forward With Herculean Effort From VMGR-252," *Leatherneck*, May 2006, 44-45.

<sup>34</sup> Commandant of the Marine Corps, "A Concept for Enhanced Company Operations," August 28, 2008, [http://www.quantico.usmc.mil/download.aspx?Path=/Uploads/Files/CDI\\_Signed%20ECO%20Concept.pdf](http://www.quantico.usmc.mil/download.aspx?Path=/Uploads/Files/CDI_Signed%20ECO%20Concept.pdf) (accessed on February 17, 2009).

<sup>35</sup> LtCol Dave O'Brien, USMC, "Urgent Universal Need Statement," U.S. Marine Corps Forces Central Command, 21 July, 2008.

<sup>36</sup> Clark, 38.

<sup>37</sup> Clark, 39.

<sup>38</sup> Jeffrey P. Pellegrino, Major, USMC, "KC-130J ISR/Weapon Kit Concept of Employment" (working paper, Headquarters Marine Corps, October 21, 2008), 1.

<sup>39</sup> Pellegrino, "KC-130J ISR/Weapon Kit Concept of Employment," 2.

<sup>40</sup> Pellegrino, "KC-130J ISR/Weapon Kit Concept of Employment," 3.

<sup>41</sup> Jeffrey P. Pellegrino, Major, USMC, "KC-130J ISR/Weapon Mission Kit" (presentation, Washington Technology Park auditorium, Chantilly, VA, December 3, 2008).

<sup>42</sup> Pellegrino, "KC-130J ISR/Weapon Mission Kit" presentation.

<sup>43</sup> Pellegrino, "KC-130J ISR/Weapon Kit Concept of Employment," 5.

<sup>44</sup> Bahneman, 29.

<sup>45</sup> Bahneman, 29.

<sup>46</sup> Bahneman, 30.

<sup>47</sup> Commandant of the Marine Corps, *Policy for Marine Expeditionary Unit (Special Operations Capable) (MEU(SOC))*, MCO 3120.9B W/CH1, February 11, 2005, <http://hqinet001.hqmc.usmc.mil/pp&o/POE/POE-301/Documents/MCO%203120.9B.pdf> (accessed February 17, 2009).

<sup>48</sup> Bruce W. Don and others, *Future Ground Commanders' Close Support Needs and Desirable System Characteristics* (Santa Monica, CA: RAND, 2002), 9.

<sup>49</sup> Don, 113.

<sup>50</sup> Commandant of the Marine Corps, *Policy for Marine Expeditionary Unit (Special Operations Capable) (MEU(SOC))*.

<sup>51</sup> Commandant of the Marine Corps, *Policy for Marine Expeditionary Unit (Special Operations Capable) (MEU(SOC))*.

---

## Bibliography

- Bahneman, Daniel. "C-130J Training Advances: Devices and training support improvements." *Marine Corps Gazette* 90, no. 9, September 2006, 29.
- Berteling, John B., Colonel, USMC(Ret). "The C-130 and the Corps – The Early Years." *Marine Corps Gazette* 78, no. 5, May 1994, 27-30.
- Bongiorno, Bill. "Squadron cited for 25 years of accident-free service." *News-Times*, May 11, 1984.
- Broadway, Michael W. "The Marine KC-130: Evolution of a Warrior." *Marine Corps Gazette* 78, no. 5, May 1994, 22.
- Clark, Kenneth W., Captain, USMC. "The Forgotten Asset: Marine KC-130s." *Marine Corps Gazette* 78, no 5, May 1994, 38-41.
- Commandant of the Marine Corps. "A Concept for Enhanced Company Operations." August 28, 2008. [http://www.quantico.usmc.mil/download.aspx?Path=/Uploads/Files/CDI\\_Signed%20ECO%20Concept.pdf](http://www.quantico.usmc.mil/download.aspx?Path=/Uploads/Files/CDI_Signed%20ECO%20Concept.pdf) (accessed on February 17, 2009).
- Commandant of the Marine Corps. *Policy for Marine Expeditionary Unit (Special Operations Capable) (MEU(SOC))*. MCO 3120.9B W/CH1, February 11, 2005. <http://hqinet001.hqmc.usmc.mil/pp&o/POE/POE-301/Documents/MCO%203120.9B.pdf>.
- Don, Bruce W., John A. Friel, Thomas J. Herbert, and Jerry Sollinger. *Future Ground Commanders' Close Support Needs and Desirable System Characteristics*. Santa Monica, CA: RAND, 2002.
- Gardner, Brian. "When You Need A Buddy: Aerial Refueling in the US Navy." *The Hook* 11, no. 3, Fall 1983, 21.
- Flight Safety Foundation, "ASN Aircraft accident Lockheed KC-130R Hercules 160021 Shamsi," *Aviation Safety Network*, April 18, 2006, <http://aviation-safety.net/database/record.php?id=20020109-0> (accessed on February 13, 2009).
- Hamel, James, Cpl, USMC. "Operation Iraqi Freedom Moves Forward With Herculean Effort From VMGR-252." *Leatherneck*, May 2006, 44-46.
- Headquarters U. S. Marine Corps. *Assault Support*. MCWP 3-24. Washington, DC: U.S. Marine Corps, August 2, 1999.
- Headquarters U. S. Marine Corps. *Aviation Operations*. MCWP 3-2. Washington, DC: U.S. Marine Corps, May 9, 2000.

---

Headquarters U.S. Marine Corps. *The Marines in Vietnam, 1954-1973: An Anthology and Annotated Bibliography*. Washington, DC: History and Museums Division, 1985.

Historical Foundation and Aviation Museum, "The Flying Leatherneck," Marine Corps Air Station Miramar, San Diego, CA. <http://www.flyingleathernecks.org/transport.html> (accessed on February 17, 2009).

Llinares, Rick. "KC-130J: New Hercules for the Marines." *Naval Aviation News* 86, no. 1, November-December 2003, 32.

McGowan, Sam. *The C-130 Hercules: Tactical Airlift Missions, 1956-1975*. Blue Ridge Summit, PA: Tab Books Inc., 1988.

Mersky, Peter B.. *U.S. Marine Corps Aviation: 1912 to the Present*. Baltimore, MD: The Nautical & Aviation Publishing Company of America, Inc., 1997.

Neeley, Dwight C., LtCol, USMC. "Evolution of the USMC KC-130 Primary Mission." Master's thesis, Marine Corps University, 2004.

O'Brien, Dave E., LtCol, USMC. "Urgent Universal Need Statement." U.S. Marine Corps Forces Central Command, 21 July, 2008.

Pellegrino, Jeffrey P., Major, USMC. "KC-130J ISR/Weapon Kit Concept of Employment." Working paper, Headquarters Marine Corps, October 21, 2008.

Pellegrino, Jeffrey P., Major, USMC. "KC-130J ISR/Weapon Mission Kit." Slide presentation, KC-130J Transition Task Force, Washington Technology Park auditorium, Chantilly, VA, December 3, 2008.

Pike, John. "KC-130." *Global Security*, June 15, 2005. <http://www.globalsecurity.org/military/systems/aircraft/kc-130.htm> (accessed on February 13, 2009).

Pike, John. "KC-130J," *Global Security*, June 15, 2005. <http://www.globalsecurity.org/military/systems/aircraft/kc-130J.htm> (accessed on February 13, 2009).

Shore, Moyars S., Capt, USMC. *The Battle for Khe Sanh*. Washington, DC: U.S. Marine Corps Historical Branch, 1969.

Stearns, LeRoy D. LtCol, USMC. *U.S. Marines in the Persian Gulf, 1990-1991: The 3d Marine Aircraft Wing in Desert Shield and Desert Storm*. Washington, D.C: History and Museums Division, 1999.

Turner, Paul St. John. *Aircraft Profile*. Windsor, Berkshire, England: Profile Publications Limited, 1971.

---

VMGR 152, "Command Chronology for the period 1 February through 29 February 1968," 1968, United States Marine Corps History Division, Historical Reference Branch, Quantico, VA., VMGR-152 Collection.

VMGR 252, "VMGR-252 Lessons Learned for Operation Desert Shield/Desert Storm," May 16, 1991, United States Marine Corps History Division, Historical Reference Branch, Quantico, VA., VMGR-252 Collection.