

Air Mobility Challenges in Sub-Saharan Africa

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As the C-130E broke through the uncharacteristic cloud deck that hung above the Ethiopian air base in the city formerly known as Debre Zeyit, about 50 km outside of the capital city Addis Ababa, one must consider the events that brought it here. Less than six years ago this aircraft belonged to the Puerto Rico Air National Guard. Since then it had been retired to the boneyard, selected for inclusion into the excess defense article (EDA) program, and granted to Ethiopia. What followed during the next two years can be characterized as bureaucratic malaise and long stretches of inactivity punctuated by brief periods of intense action followed by more than a year-long process of undergoing programmed depot maintenance at a cost of about \$15 million to US taxpayers.

This will be the sole C-130E in the small, diverse fleet of the Ethiopian air force mobility aircraft. The aircraft and associated \$24 million support package has been provided through strategic US government initiatives aimed at solving the air mobility challenge in sub-Saharan Africa. The manner air mobility is addressed in Ethiopia is consistent with how it is addressed throughout the continent and, at a cost of millions of dollars per year; has failed to solve the foundational problems of the lack of high-level maintenance options and too few aircraft. For that reason, there has been no appreciable capability growth across the region, despite the expenditure.

Since its inception in 2001, the African Union (AU) has been a forum through which the 54 member states could discuss and resolve significant issues which plague the continent. The AU charter is comprised of the same general ideals, security, freedom, and peace, which can similarly be found in other international organizations, such as the North Atlantic Treaty Organization (NATO), the European Union (EU), and the United Nations (UN). Unlike its Western contemporaries, however, the AU possesses a noteworthy capability shortfall that significantly constrains the potentially impactful organization's ability to achieve desired results. Globally, air mobility's role as a force multiplier has been proven, be it in Iraq while preceding military operations to build regional forces, or immediately following a natural disaster such as the 2011 earthquake in Japan, when aid personnel arrived on the ground within 24 hours of the beginning of the crisis.

Sub-Saharan Africa represents a glaring void where the capability is still not adequately reliable. While at strategic, coastal locations, such as Djibouti and Senegal, there is suitable infrastructure, they are strikingly insufficient across the approximately 45 nations that comprise sub-Saharan Africa.¹ This simple truth is particularly problematic due to seemingly constant warfare, habitually poor governance, and natural disasters that demand a need for the capability, arguably more than any other place on earth. The perpetual need to rapidly deploy personnel and resources is vital to averting disasters in this part of the world on an almost annual basis, but despite continuous, expensive attempts, the challenge has not yet been sufficiently addressed.

The UN, NATO, and the United States government (USG), as well as others to some degree, have dedicated funds to the problem of sub-Saharan African air mobility for decades but without a coherent, coordinated effort. For the USG, the answer has evolved around support to the Legacy C-130E/H due to the multitude of aircraft on the continent and availability in the USG inventory. Exact fiscal data allocated to air mobility in this region from all sources is difficult to ascertain, but it certainly totals in the hundreds of millions of dollars in the past decade. Despite routinely celebrating successful military training engagements with regional partners, all this effort and money has yielded the C-130 operationally effective rate of about 30 percent.² It is clear the status quo is not working, and neither international or USG money is resolving the fundamental challenges associated with air mobility in sub-Saharan Africa. The efforts of interested parties must be coordinated in a practical, deliberate manner to solve this problem while simultaneously emboldening the AU with the resources required to be a viable force for good on the continent.

The Problem

You will not find it difficult to prove that battles, campaigns, and even wars have been won or lost primarily because of logistics.

– Gen Dwight D. Eisenhower

When it becomes apparent that a response to an African crisis is necessary, the AU must engage in lengthy negotiations with capable regional partners and member states to obtain the use of air mobility resources. Even after obtaining initial lift support, the duration and risk of operations, as well as the priority placed on supporting the operation by the airlift provider, often changes. Vital supply lines become unreliable, and ground commanders are often placed in difficult situations absent food or ammunition. These negotiations must occur at the height of the emergency often causing a loss of the initiative by AU, UN, or friendly forces.³ Nearly two years after the start of the African Union-United

Nations Hybrid Operation in Darfur the force was stagnated at 68 percent of required manning due to a lack of ability to resupply forward deployed troops.⁴ It should be self-evident that this has a direct correlation to the success of AU operations and many times their ability to defeat terrorist organizations that routinely threaten the US and Western allies.

The first major peace support operation (PSO) conducted by the AU after its inception occurred in 2003. This mission was initiated to enforce a ceasefire between the Burundi government and rebel groups and was known as the African Mission in Burundi (AMIB).⁵ While ultimately AMIB was successful in deploying more than 3,000 peacekeepers and stabilizing about 95 percent of Burundi in order for the UN to assume responsibility, significant limitations were revealed.⁶ The AU, recognizing its inability to provide for logistics to support PSOs, turned that responsibility over to the individual nation who, in turn, frequently requested support from outside organizations, such as the US, UN, NATO, or EU. These organizations were critical to providing airlift and logistics support to AMIB.⁷ This model of logistics support, in other words, deferring the responsibility to the inflicted nation, became the AU standard operating procedure, and it persists in operations conducted to this day.

The second major AU PSO was the African Mission in Sudan (AMIS) in May 2005. This mission was charged with monitoring the ceasefire between north and south Sudan and to provide for security in Darfur. AMIS was mandated to deploy 7,000 peacekeepers within one year and, out of necessity, relied exclusively on NATO for airlift support.⁸ This dependence on outsiders resulted in significant delays to troop rotations due to NATO and EU competition for limited air mobility resources. There are important health and welfare repercussions associated with delaying troop rotations as well as food and supply shortages that should not be ignored. A lack of focus on troop welfare naturally leads to misconduct as well as the associated remedial actions that detract from mission focus.⁹

A third major PSO is that of the AU Mission in Somalia established in 2007. This mission is designed to support the transitional federal government with security, humanitarian assistance, stabilization, and reconstruction efforts.¹⁰ While the AU mandate called for the deployment of 8,000 troops as an initial force, only 3,000 were sent due to insufficient transportation and sustainment capacity.¹¹

The AU has failed to provide mandated troop levels in Burundi, Sudan, and Somalia, and the costs have been borne by the troops on the ground and the international partners who benefit from AU success. Peacekeepers must be provided with suitable, reliable logistics chains to achieve desired results. The AU has not been able to meet that basic demand absent substantial external support.¹² In 2007, the AU established the goal of being capable of autonomously providing

airlift to support regional objectives. Their vision includes the ability to conduct inter-, as well as intratheater airlift and to also conduct tactical rotary wing operations. Attached to the bold initiative is an exorbitant price tag to fund a variety of aircraft types.¹³ Thus far, the costs have proven too much, and any semblance of success has not manifested. Therefore, the AU recognizes this key shortfall and has dedicated a tremendous amount of time and resources in attempts to resolve it. The USG has done so similarly but has invested resources through bilateral means rather than through the multilateral organization charged with executing operations of interest to the USG.

The United States and Sub-Saharan Africa Air Mobility

Over the last several decades, the USG has invested millions of dollars every year to support air mobility capability growth in sub-Saharan Africa. The USG has done this through various State Department and Department of Defense security cooperation and security assistance programs. This financial support has been directed to individual nations to bolster their C-130 maintenance capability.

Additionally, multiple excess defense C-130E/H aircraft have been donated to partner nations. As a cornerstone of air mobility support, the US employs military training teams (MTT) to impart knowledge of maintenance and aircrew operations related to these aircraft. Almost without exception, those MTT engagements return and are hailed as successful, which they largely are. The partner nation capability is certainly increased and much is learned. The success of these individual, tactical level engagements stand in contrast, however, to the overall operationally effective rate of C-130s in sub-Saharan Africa of between 20–30 percent.¹⁴ The tactical level gains achieved with individual nations collide with the strategic reality that:

(1) They do not have enough aircraft to allow one to go into depot maintenance, train effectively, and fly operationally at the same time and,

(2) They have no, reasonable access to a high-level maintenance option. The existing support strategy is failing to achieve any appreciable capability growth with USG dollars and instead supports a continuous, inefficient cycle of disappointment that all but ensures a stymied development.

Expounding on the root causes of each of these shortcomings, maintenance and fleet size, reveals that they are inherently connected. In fact, one does not have to look farther than the mechanisms available to a poor nation to acquire more aircraft, particularly through US EDA programs. The USG, generally speaking and rightfully so, prefers a nation to be capable of supporting their aircraft mechanically before they are granted more. Additionally, the USG desires to see concrete, measurable results from those nations in alignment with USG interests.

When a country does not possess enough aircraft to warrant such results, because they do not possess the maintenance capacity to operate a larger fleet, these results are difficult to achieve. Therefore, the USG will not want to provide EDA aircraft in what is an extremely competitive process. Absent a large enough fleet to warrant it, private enterprises capable of conducting high-level maintenance will not want to invest in a depot level facility on the continent, which is the only way maintenance practices will increase, and the only way the USG will be willing to provide more aircraft. Until regional, governmental partners with similar interests unite contractually with one another as well as industry capable of conducting high-level maintenance, the cycle will not be broken and air mobility in sub-Saharan Africa will remain elusive.

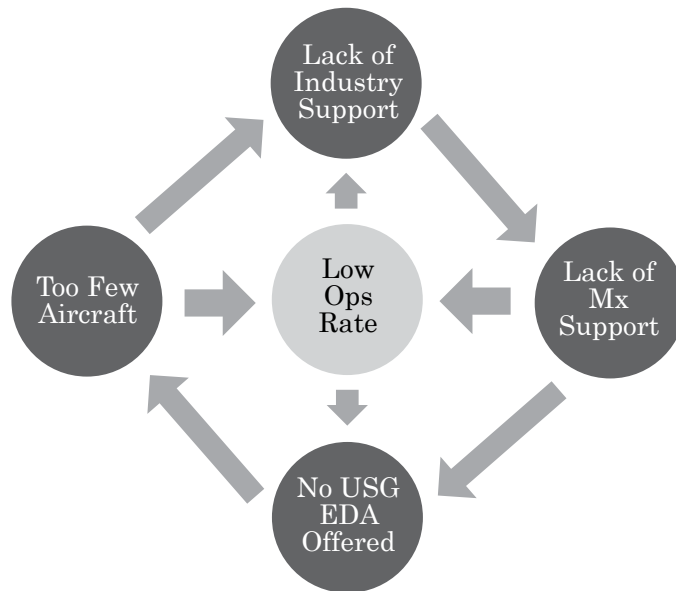


Figure 1. Low operations rate

One must be careful not to equate a specific platform with a capability. Practically, however, it seems evident that the United States has selected the Legacy C-130E/H as the aircraft of choice to support air mobility operations across the continent of Africa. This choice has been made either intentionally or by default and is evidenced by the more than 100 of the venerable workhorses which have been sold or donated to African partners via foreign military sales, direct commercial sales, or EDA programs. While about 60 of those are successfully operated by the more capable North African countries, more than 40 exist in sub-Saharan Africa, and it is among this fleet that the paltry operationally effective rate can be found.

The C-130 is the Answer

This analysis is based on the premise that the C-130 is, in fact, the “right” asset to achieve air mobility objectives in Africa. It is within the interest of the United States to promote the operation of the C-130 in Africa because of capability, availability, and partner nation growth potential. Few would disagree that, in terms of capability provided, the C-130 is right for Africa. Primarily in terms of cargo capacity, flight time, and unimproved surface landing capability, this asset provides the answer for a region so frequently plagued by war and famine enhanced by what has been dubbed the “tyranny of distance.” With a range of greater than 1,500 nautical miles, the capacity to carry up to 42,000 pounds of cargo, and ability to be reconfigured to adapt to a variety of mission sets, this is the perfect aircraft for a continent with limited staging locations and a lack of surveyed landing zones which may necessitate a range of 1,000 miles before refueling can occur.¹⁵

The same simplicity that is boasted by less-sophisticated platforms, limits range and cargo capacity, thereby ignoring major challenges that exist while operating in Africa. The C-130 is the only aircraft in the US inventory that is suitable for operations in Africa yet still not cost prohibitive for fledgling air forces to operate, approximately \$5-6 million annual maintenance and sustainment for a C-130H. Without question, the closest competitor to the C-130 in terms of maintaining low operating costs while providing the capability that Africa demands is the C-27. While certainly capable, this platform could not be relied upon to solve the air mobility shortfall in this region without an initial investment that few are interested in making. This choice would ignore the large quantity of C-130s already on the continent, outsource the ability to resupply spare parts to Italy, its manufacturer, and simply not satisfy the next pillar, availability.

The Legacy C-130 has delivered exceptional service to the United States for more than 50 years and is in the process of being replaced by the much more advanced and capable C-130J. This newest variant is an upgrade in almost every area of performance. The entire active duty fleet of Legacy C-130 aircraft has been retired or delivered to their Air Force Reserve and Air National Guard brethren. For this reason, it is safe to assume that within the upcoming years there will be an abundance of these still very capable aircraft available as excess defense articles, specifically the C-130H. In fact, this outcome has already manifested itself with the recent delivery of several Legacy C-130s to the Philippines.¹⁶ Based on aircraft sales and industry projections, about 80 legacy C-130 aircraft will be retired from the US inventory in the next decade.¹⁷ This trend is likely to continue for decades as Reserve and Guard units begin to phase out the battle-tested Legacy Hercules.

As the C-130H divestiture continues, a historic opportunity is presented. At a comparatively low cost to the US taxpayer, a continent can be convinced that the C-130 should be the platform of the future. As the individual economies across Africa continue to develop, and militaries seek to enhance their own capability, they will undoubtedly seek to transition to the more advanced version of what they already know, the C-130J. This natural progression will lead to an entire new generation of economic gains for a major US defense company, Lockheed-Martin, resulting in American jobs. This vision will only be realized, however, if the United States and Lockheed-Martin believe that investment now will result in future opportunity. It is time to take the risk and execute a consolidated, focused venture across Africa in the areas of C-130 maintenance and training.

The Excess Defense Article Program

Efficient use of the Excess Defense Article (EDA) program would be an essential component of any coordinated effort to solve Africa's air mobility challenge. The EDA program is designed so a nation assumes responsibility for an asset "as-is, where-is" and funds all moving, receiving, and repairing costs of the asset.¹⁸ With regards to an aircraft, these costs routinely reach into the tens of millions of dollars, normally due to required depot maintenance. When it is determined that an aircraft will no longer be used by the US Air Force (USAF), the fleet managers and maintenance commanders, prudently, make the determination that the aircraft will no longer receive scheduled maintenance beyond a given date. They do not want to allocate limited resources to an aircraft that will simply be deposited in the USAF boneyard without consideration or interest in alternate courses of action for that airframe. By the time it is determined that the aircraft will be offered via EDA, it is too late to schedule that neglected programmed depot maintenance (PDM). Therefore, the aircraft sits, uncovered, until it is acquired when it immediately has an associated price tag for PDM, an average of around \$10 million for a C-130H. How this generally materializes in Africa, however, is that because the USG has a vested interest in a nation possessing an aircraft, and the associated capability it offers, the USG pays for the movement and "make-ready" costs of the asset and not the recipient nation. That cost is significantly higher than if the USG would have maintained the aircraft's original PDM schedule.

It would behoove both the USG and recipient nations to closely scrutinize the EDA program to determine how these costs could be reduced. As part of a comprehensive, African C-130H EDA plan, assets should be identified one to two years in advance. Rather than maintenance simply being neglected, the AU, a recipient nation, or the USG can continue to fund that routine maintenance. Such

an option for a recipient nation would allow them to stake their claim on an aircraft as well as to begin a security cooperation relationship with the investment of their own capital. For the USG's part, continuing to fund the depot maintenance requirements of an aircraft would ultimately reduce those acquisition costs. If the aircraft is transferred to a nation that cannot afford to pay those costs, the USG will have saved money, considering it would pay those costs regardless. If the nation pays those PDM costs, the USG will have saved the recipient nation money. The premise is simply that these aircraft *will* go somewhere and as part of a comprehensive sub-Saharan Africa air mobility strategy, the EDA acquisition costs could be greatly reduced.

Industry Support

While the USG can overcome the challenge of limited aircraft to operate, train, and repair it will require support from private industry to increase the regional knowledge and capability to conduct high-level depot maintenance. Even in Western militaries this high-level maintenance work is conducted by contracted support facilities, operated by the aircraft manufacturer. Currently there is a noticeable absence of such facilities in Africa, despite the presence of more than 100 C-130s on the continent with about half in sub-Saharan Africa. While the aircraft have been present, the money to pay for maintenance has not been.

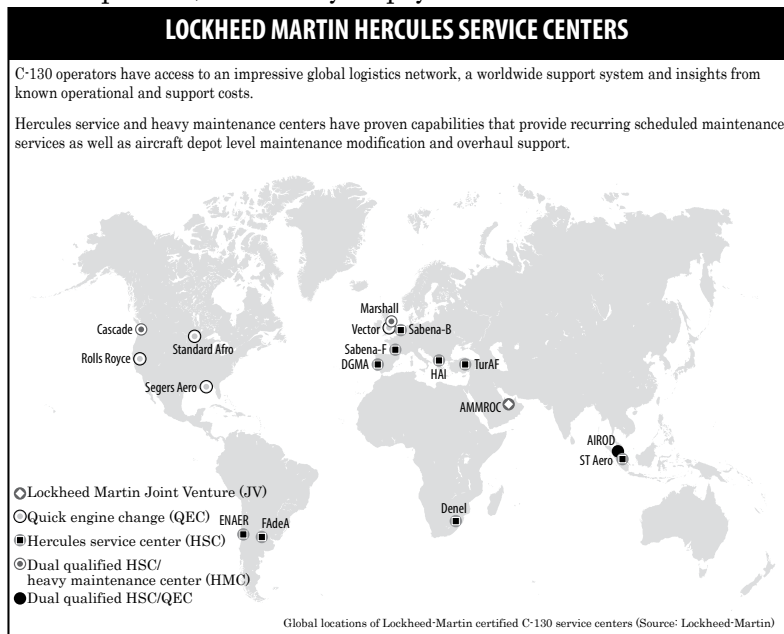


Figure 2. Global Locations of Lockheed Martin Certified C-130 Service Centers (Source: Lockheed Martin)

Industry support to C-130 maintenance operations will grow in proportion to the number of aircraft and investment of capital into the enterprise. The lure of more aircraft, a desire by the AU to select member states to receive aircraft that will be, at least partially, funded by the AU, and then the need of the AU to select one or more strategically located staging sites of those aircraft will inspire individual nations or industries to accept the risk associated with building a depot facility. The previously stated low operationally effective rate of C-130s in sub-Saharan Africa reveals a significant potential opportunity. Accompanied with the much lower cost of manpower across the region, the prospect for a tremendous amount of money to be made exists.

As a business entity, Lockheed Martin must certainly remain aware of the market-share of C-130s for existing depot facilities before creating new ones. The USG can incentivize Lockheed-Martin to support by committing to providing more C-130s, increasing the market, contingent upon the facility development. The potential customers for the new depot facility would be newly received aircraft and those which have previously not undergone depot maintenance at all, thereby, enabling existing depot facilities to sustain their current business tempo. Finally, it should be noted that manpower costs in most sub-Saharan African nations are significantly lower than those in Europe or the United States, which should lower the overall depot maintenance cost making it more achievable for lower income African nations. As has been the case in other regions of the world, industry will ultimately be necessary to solving this air mobility challenge.

NATO's Strategic Airlift Capability

It is an important point that a regional solution to an air mobility challenge and an international organization leading such an enterprise is not unheard of. The Heavy Airlift Wing (HAW) was established in 2008 in Pápa, Hungary by ten NATO countries plus two others to “acquire, manage, support, and operate three Boeing C-17 strategic transport aircraft.” This multinational organization operates as a subagency within NATO and, obviously, not all NATO members are HAW members. Membership does, however, remain open should others become interested. The three C-17s are registered and flagged under the host nation of Hungary, but are owned by the 12 Strategic Air Command (SAC) member nations, each owning a portion of the available flight hours. The aircraft are available for use by those nations without preconditions to serve the specific needs of their own national defense, NATO, EU, or UN efforts. They are maintained by civilians through a foreign military sales contractual agreement with Boeing.¹⁹ Currently the organization is commanded by a USAF colonel and is comprised of about 145 multinational maintenance and aircrew personnel derived from its member-states.

The success of the HAW and the overall strategic initiative has been extraordinary at multiple levels. First, operationally, less than a year after receiving their first C-17, SAC flew three separate missions into Haiti following the 2010 earthquake. They delivered humanitarian aid, as well as personnel to the devastated island nation.²⁰ Additionally, SAC has supported the International Security Assistance Force in Afghanistan consistently from 2009–2014. Furthermore, this organization is frequently involved in supporting UN operations across Africa, as was the case in 2013 with the UN Multidimensional Integrated Stabilization Mission in Mali and the UN Mission in the Republic of Central Africa in 2015.²¹

While the operational success of SAC is well-documented, the organization's existence also boasts second and third-order effects. The integration of Boeing into the community of Pápa, Hungary offers an opportunity for job creation and economic prosperity to the citizens in that area. The relationship of Boeing is such that the C-17 fleet is provided with on-site maintenance, engineering, and spare parts. Such an integrated role in the community has allowed Boeing to offer scholarships and internships to continue to grow the regional expertise in this field.²² If emboldened in one or more nations in sub-Saharan Africa, the economic impact of this new industry and contact with a proven, Western company could produce a generation of economic prosperity.

Conclusion

Status quo support to sub-Saharan African air mobility has proven insufficient and expensive. The USG has not realized the results it needs to justify the continued support of individual, bilateral programs without solving the enduring institutional challenges of fleet size and high-level maintenance. Every new crisis in Africa is met with the same daunting task of logistics and air mobility and, frequently, the AU limitations with regards to air mobility becomes the challenge for the USG and Western partners to either solve or accept defeat on issues of national importance, in other words, terrorism, disaster relief, pandemics, etc. The carrot and stick mechanisms exist today for the United States to motivate all actors towards a real solution to this problem.

The USG must view air mobility as a resource of a region, however, and not of a single nation. A comprehensive plan in association with and led by the AU must and can be inspired to action by the unprecedented availability of C-130H aircraft. Capable industry partners must be engaged by the AU and USG to motivate them to grow their depot facilities in Africa, encouraged by the more than 40 current C-130s and promise of more operating there. The AU must determine cost sharing mechanisms with individual member states to share the burden of maintenance and operations of these aircraft. Individual nations can be motivated

by the prestige and access to aircraft that will be theirs should they be selected to stage the aircraft and operate the depot facility. The US is in a position to stimulate an initiative to solve the decades-old problem, but must first adapt existing programs to the strategic realities of providing support to Africa.

Following the characteristic brake squeal of a perfect aircraft touchdown, the Ethiopian C-130E, Tail No. 1564 taxied to park in front of the entourage of US and Ethiopian commanders present for the occasion. The onlookers watched as the front-top hatch opened and, after a brief pause, the Ethiopian lead navigator emerged wearing his US provided, light-green Dave Clark headset and brandishing the Ethiopian flag. The sense of national pride that swelled through the crowd was tangible, and it hung in the air as the lower-ranking maintainers and aircrew present on the fringes of the small crowd began to cheer. The general's chests swelled with pride at the sight. It is clear that our African partners are desperate to provide for their own defense just as partners throughout Europe, Asia, and the Americas.

As the powerful, turbo-prop engines spin to a stop, and the crew entrance door swings open, no one can know how much longer the United States will be involved in supporting this aircraft, or how long Ethiopia will be able to maintain it without reasonable access to a depot facility. Even if they had that access it is unlikely that they could take it "off the line" long enough to allow it to go. NATO was able to overcome intense challenges to solve their regional airlift issues with the creation of the HAW. Ultimately, the African solution will be as different as the nations which comprise the two international organizations. The United States, now more than ever, possesses the ability to motivate action to solve this problem with the retirement of the Legacy C-130. No single person or organization possesses all the answers or abilities to finally develop a solution, but there are certainly several specific actions that the USG can take to align the conversation of all interested parties and change the status quo.

Recommendations

The USG should agree to provide three or more C-130H aircraft to a framework nation in sub-Saharan Africa that is willing to use national funds to create a Lockheed Martin Certified Depot Facility. The framework nation must commit to funding the "make-flight-ready" PDM costs associated with acquiring EDA C-130 aircraft and conducting that maintenance in their new PDM facility. At the national level, they should be motivated to do so because their national funds will remain in-country, albeit their air force will likely be paying their industry. Additionally, the regional economic growth and academic programs that would

follow the introduction of Lockheed Martin should incentivize this framework nation.

The USG should engage with Lockheed Martin to arrange an agreement that US-provided aircraft will utilize the new PDM service center, thereby reducing risk and increasing the market. This action will entice Lockheed Martin to actually support. Additionally, Lockheed Martin may be incentivized by the notion of Africa eventually transitioning to the J-Model C-130 as their national economies develop. Lockheed Martin must determine with which nation and industry they would like to engage. There are multiple reasonable options throughout the continent, like major airlines or capable militaries that already conduct depot maintenance on other platforms.

The AU must develop an innovative funding model to financially support at least a portion of the operational and maintenance costs of the aircraft, thereby purchasing access to the iron when needed. A direct funding model could be used, but also a flight-hour sharing construct should be negotiated between the framework nation, AU, and other capable partners in Africa. Other capable partners should be given the opportunity to assign aircrew and maintenance personnel to the framework nation and to interfly on these aircraft and train alongside their fellow Africans. This would begin to align doctrine and training practices.

AU and the USG should determine strategic locations where they would like aircraft staged in Africa to ensure continental coverage. The USG should negotiate support for training and facility development at those strategic locations to ensure access for American aircraft. This would increase US reach throughout Africa increasing global reach in a difficult region. The USG should develop a model to actually conduct security cooperation activities through the AU. On a case-by-case basis, a transition must be made from bilateral security cooperation to regional or multilateral activities for regional capabilities, like air mobility or intelligence sharing, for example. The EDA program should be closely scrutinized to identify efficiencies which would greatly reduce the cost for recipient nations as well as the United States.

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