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C-130 Hercules: Background, Sustainment, Modernization, Issues for Congress

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Summary

The United States primary tactical airlift aircraft is the C-130. Nicknamed the Hercules, this venerable aircraft has been the workhorse of U.S. tactical airlift for the past 57 years. The majority of C-130s in the U.S. government are assigned to the U.S. Air Force, but the U.S. Navy, Marine Corps, and Coast Guard also operate sizeable C-130 fleets. The potential concerns for Congress include oversight of and appropriations for an aging C-130 fleet.

As the C-130 fleet ages, management issues arise with reduced reliability, obsolescence and reduced parts availability, and changing aviation rules that impact the C-130's ability to operate worldwide. The C-130 program recently passed a major milestone; the FY2013 NDAA authorized the Secretary of the Air Force to enter into one or more multi-year contracts for the procurement of C-130J aircraft for the Department of the Air Force and the Department of the Navy. This was a significant step toward recapitalizing a portion of the fleet. As Congress decides the future of the tactical airlift fleet, a significant decision is whether or not to continue recapitalizing the fleet with new aircraft. This issue is fueled by several factors, including aircraft life cycles, cost, basing strategy, strategic guidance, the industrial base, and the desired capabilities mix. With these factors in mind, the services have committed to recapitalize a large portion of the C-130 fleet. However, at current production rates, there will still be aircraft in the fleet much older than the crews that fly them well into the future.

A common strategy to extend the life of an aircraft fleet is to modernize the current airframes with new components. This strategy attempts to combat issues that plague an aging fleet such as diminishing reliability, antiquated avionics, and capabilities that no longer meet current requirements. The cost of modernization is commonly the driving factor behind these efforts. Analyzing the return on investment of modernizing components on aging aircraft versus recapitalizing the fleet to gain new capabilities will inform these decisions. Congress is currently faced with deciding the future of several modernization efforts being considered for the C-130 fleet.

Circumstances that arise due to the changing nature of the global environment may drive decisions by Congress to reduce the size of the fleet by divesting some aircraft. With the current drawdown of U.S. military forces, perhaps the desired future capability can be met with fewer aircraft. Divesting aircraft from a fleet involves a detailed analysis of the capabilities that remain in the desired end-state fleet. Ideally, the required capabilities to meet strategic guidance still reside within the system as a whole when aircraft are retired. The mix of Active and Reserve forces that remain after drawing down a fleet may also be a significant concern. This mix of Active, Guard, and Reserve forces may also lead to decisions regarding force structure. Adjustments to force structure within the Guard and Reserve have been a contentious issue in the past and will require congressional oversight and approval.

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Introduction

The national defense strategy of the United States is evolving in response to changing global environments. As Congress responds to these changes, an important aspect is the responsibility for oversight and appropriations for an aging tactical airlift fleet. The C-130 has been the cornerstone of the U.S. tactical airlift fleet since the late 1950s. Military planners believe that C-130 aircraft provide the United States an edge in achieving national goals. They provide a capability to rapidly deliver forces making conventional deterrence more effective and expanding the ability to provide humanitarian assistance. However, the fleet has aged with some current models being flown by aircrew younger than the aircraft they are flying. As the fleet ages, management issues arise with reduced reliability, obsolescence and reduced parts availability, and changing aviation rules that impact availability of airspace due to obsolete avionics capabilities.

Over the past 57 years, several models of the C-130 were built and delivered to the U.S. Air Force, Navy, Marine Corps and Coast Guard, with the C-130J model being the most recent. These aircraft are referred to as tactical airlifters because they can deliver passengers and cargo directly into remote or austere areas. In contrast, strategic airlift delivers capability on a global scale and more routinely operate from large airports.

The FY2013 National Defense Authorization Act provided guidance on recapitalizing a portion of the C-130 fleet, but a significant number of aircraft may still need to be replaced, modernized or retired to maintain the desired capabilities. Recapitalizing refers to replacing older model aircraft with new production aircraft. As Congress shapes the tactical airlift fleet of the future, there may also be decisions regarding force structure or infrastructure that may impact C-130 basing.

While these aircraft may be supporting the individual service's mission on a day to day basis, they are also routinely assigned to joint commands in support of ongoing operations. Warfighting and theater engagement is conducted by geographic combatant commands. These combatant commands are often operationally assigned C-130s to accomplish their mission. Based on this command relationship, there may be an Air Force C-130 assigned to a base in Arkansas temporarily stationed within one of the combatant command's area of responsibility (AOR) executing operations in support of the defense strategy. For example, when called upon during crisis such as the super typhoon Haiyan that struck the Philippines in November 2013, tactical airlift played a critical role in delivering aid within the region.

As stated in the 2014 Quadrennial Defense Review, the U.S. military must be prepared to

- protect the homeland, to deter and defeat attacks on the United States and to support civil authorities in mitigating the effects of potential attacks and natural disasters;
- build security globally, in order to preserve regional stability, deter adversaries, support allies and partners, and cooperate with others to address common security challenges; and
- project power and win decisively, to defeat aggression, disrupt and destroy terrorist networks, and provide humanitarian assistance and disaster relief.

To accomplish these goals, the U.S. military needs the ability to deploy rapidly and sustain capabilities to all regions of the world. Maintaining the correct mix of intra- and inter-theater airlift provides this capability.

In his most recent overarching guidance to the Department of Defense,[1] President Obama outlined several guiding principles of force and program development to ensure mission success:

- maintain a broad portfolio of military capabilities that, in the aggregate, offer versatility across the range of missions;
- differentiate between those investments that should be made today and those that can be deferred;
- maintain a ready and capable force, even as we reduce our overall capacity;
- reduce the "cost of doing business;"
- examine the mix of Active Component (AC) and Reserve Component (RC) elements best suited to the strategy; and
- make every effort in adjusting U.S. strategy and attendant force size to maintain both an adequate industrial base and investment in science and technology.

In regards to maintaining a broad portfolio of capabilities, tactical airlift is often considered a critical element in offering versatility. Versatility in this context is how quickly and easily the military can transition between missions. For example, a C-130 could provide humanitarian support to a natural disaster area in the morning and swing to transporting military forces into a combat operation later that day. How this resource is managed may shape how versatile future U.S. capabilities will be. This report will examine some factors in deciding which C-130 investments may be made today or deferred and in doing so which capabilities are at risk. This report will also review, in light of current investments, the C-130 acquisition strategy and review how this strategy may reduce overall procurement cost and its impact on the industrial base.

C-130 procurement is accomplished under a total force construct with the U.S. Air Force as the lead command for all C-130 procurement. This construct attempts to streamline the overall process and induce cost savings. Additionally, the C-130 fleet is particularly well suited to encourage analysis of the Active Duty/Reserve Component mix due to the large number of aircraft in the Guard and Reserve forces.

In concert with these guiding principles, this report will review the following congressional issues associated with managing an aging C-130 fleet:

- How many C-130s are needed to execute the defense strategy?
- Should the fleet continue to be recapitalized?
- Should the current fleet be modernized?
- Does the force structure support the future fleet? and
- Is the current Active Duty/Reserve Component mix correct?

[1] "Sustaining U.S. Global Leadership: Priorities for the 21st Century Defense," January 2012.

Background

Figure 1. C-130 Hercules

Source: Downloaded from http://anupkumarchaturvedi.com/00001_197.jpg, February 4, 2014.

The C-130 Hercules is a medium sized tactical transport aircraft providing multi-purpose theater support while assuming several diverse roles within the U.S. Air Force, Navy, Marine Corps and Coast Guard. Missions include tactical and intra-theater airlift and airdrop support, Arctic resupply, aerial refueling, special operations support, aeromedical evacuation, aerial spraying, firefighting duties for the U.S. Forest Service, and natural disaster and humanitarian relief missions. The aircraft is very versatile with the ability to take off and land from unprepared surfaces during day or night in hostile environments and in all weather. The aircraft is typically used to support operations within a certain theater, as opposed to the C-5 or C-17 aircraft that routinely fly cargo internationally. The bulk of the U.S. government fleet comprises 667 aircraft.[2]

[2] Aircraft Accountability: An important aspect of analyzing a dynamic aircraft fleet is how the aircraft are counted. The Program of Record (program as defined in FYDP or as updated by approved documentation) will yield one number while the accounting database or the number actually on the ramp may yield another. This is due to many factors including retirements, procurements, and heavy maintenance cycles which require an aircraft to fly to a maintenance facility for an extended period of time. For the purposes of this report, the aircraft assigned data was used to build the inventory data and the Program of Record data is used to define requirements.

There are a small number assigned to other agencies, such as the U.S. Forest Service, but this report will focus on the aircraft assigned to the USAF, USN, USMC and the USCG.

Air Force

The majority of the USAF C-130 fleet comprises C-130H and J models flying combat delivery missions, which entail the aerial transport of cargo and passengers. As of February 2014, 362 C-130 aircraft are assigned to this mission in the active duty, Air National Guard and Air Force Reserves.[3]

Due to the unique aspects of the C-130, several versions of the aircraft have been modified from the traditional airlift mission to support special missions. The major versions are the AC-130, MC-130, HC-130 and EC-130 (see **Table 1**). These aircraft are flown by Air Force Special Operations Command (AFSOC), Air Combat Command (ACC), and the Air National Guard. 152 modified C-130s support special operations missions.[4]

Navy

The Naval Air Systems Command manages a fleet of 94 C-130 aircraft. The Naval Reserves fly 20 C-130T aircraft, which provide logistics support to Navy operating forces and transports personnel or cargo. The active duty and Marine Corps Reserve operate the remaining 74 USMC KC-130T/J aircraft. The KC-130T and KC-130J aircraft provide logistic support, air-to-air refueling and close air support to fleet operating forces.[5]

Coast Guard

The Coast Guard manages a fleet of 28 HC-130s. Six of the HC-130s are the new J model aircraft. The HC-130 provides the Coast Guard with a long range surveillance aircraft capable of search and rescue operations, command and control, and air-to-air refueling.[6] These aircraft are responsible for coverage of both the Atlantic and Pacific areas.

C-130 Fleet View

The illustration below is one way to view the C-130 fleet. There are commonalities across the entire fleet but there are also issues common only to specific groups so it may be helpful to view the entire fleet as smaller groupings. The USAF combat delivery aircraft flown by the active duty, Air National Guard and Air Reserves combine into one group with Special Operations aircraft lumped into another group within the Air Force. The Navy fleet comprises Naval Reserve aircraft with Marine Corps Active duty and Reserve aircraft. Finally, the Coast Guard fleet is presented as a single fleet. The USAF combat delivery group has had the most attention from Congress in the

[3] Aircraft data extracted from USAF Reliability and Maintenance Information System (REMIS), February 2014.

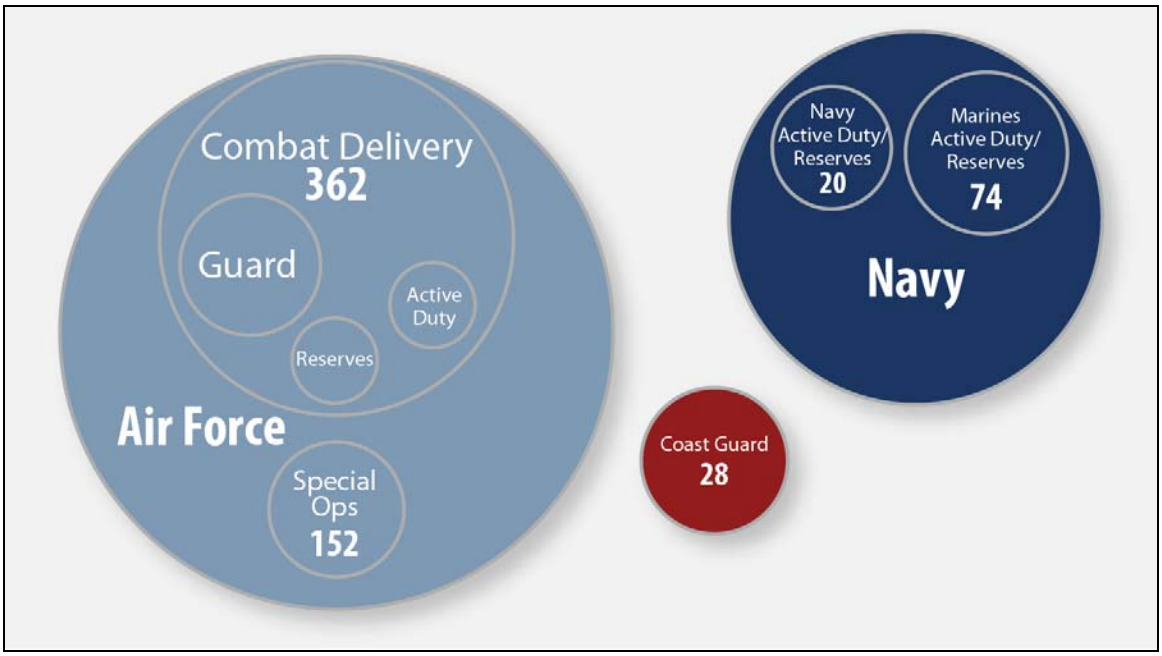
[4] Ibid.

[5] Naval aircraft data retrieved from NAVAIR website at http://www.navair.navy.mil/index.cfm?fuseaction=home.display&key=96163E6F-65F2-42, February 2014.

[6] Coast Guard data retrieved from USCG, Office of Aviation Forces website at http://www.uscg.mil/hq/cg7/cg711/c130h.asp, February 2014.

recent past. This grouping includes all the Air National Guard and Reserve combat delivery aircraft. The group was also the focus of the FY2013 NDAA directed "floor" of 358 intra-theater aircraft.[7]

Figure 2. C-130 Fleet Groupings



Notes: Graphic provided to illustrate different groupings of C-130 aircraft. Actual numbers within each fleet fluctuate due to retirements, new aircraft deliveries, and accounting practices when aircraft are in transitional phases like depot level maintenance. Data current as of February 2014.

The table below outlines the primary models assigned to each service and the number of aircraft. One should keep in mind that the fleet is managed dynamically with new aircraft entering service and others retiring so the numbers fluctuate on a small scale. The aircraft will also routinely change status when they are sent to long term modifications or depot level maintenance which will slightly change the numbers assigned. The table represents the most accurate data at the time the table was populated.

Table 1. C-130 Models Flown, by Service

	No.	Mission
Air Force		
C-130H (Combat Delivery)	261	Model generally similar to E, with updated turboprops, redesigned outer wing, improved pneumatic systems. First delivery in July 1974.
C-130J (Combat Delivery)	10	Flies faster, higher, and farther than earlier C-130s. ANG and AFRC units began receiving J models in 1999, Active units in 2004.
C-130J-30 (Combat Delivery)	90	Stretch version of the J model capable of larger payload.

[7] H.R. 4310-308, Section 1058.

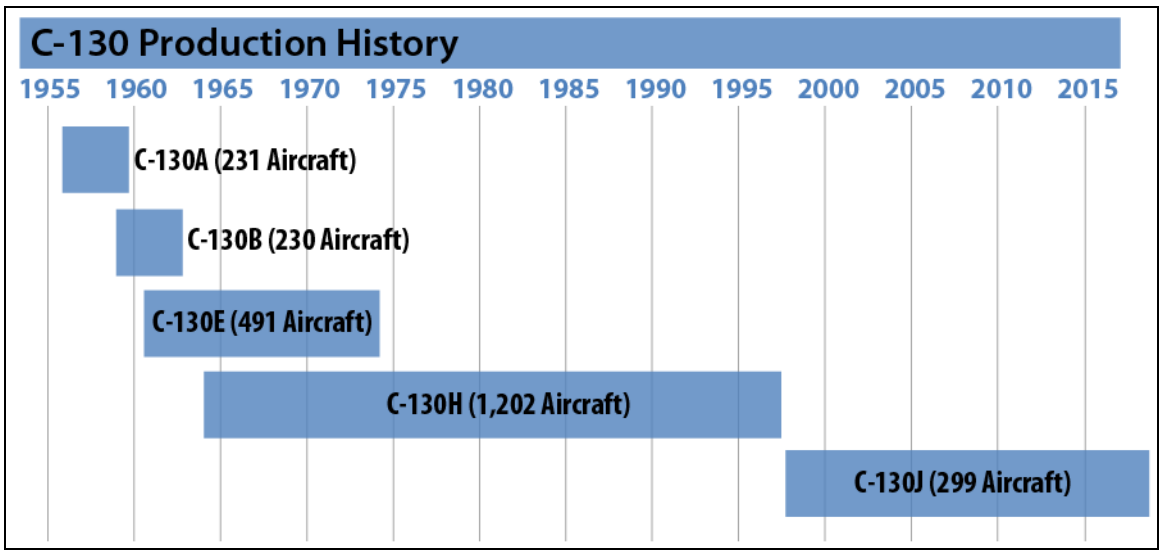
	No.	Mission
AC-130H/U/J Spectre/Spooky	37	Heavily armed aircraft using weapons integrated with sophisticated sensor, navigation, and fire-control systems to provide precise firepower.
EC-130H Compass Call	14	A heavily modified C-130H used for electronic warfare.
EC-130J Commando Solo	7	A heavily modified C-130J used for psychological warfare broadcasts and information operations.
HC-130H/N/J Combat King	43	Dedicated as a personnel recovery platform, designed to operate in hostile environments and provide Command and Control and helicopter in-flight refueling.
LC-130H	10	Flown by ANG out of Schenectady, New York. Polar version of the C-130 equipped with ski landing gear enabling operations on snow or ice.
MC-130H/P/J Commando	54	Aircraft flies clandestine or low-visibility, low-level missions into denied areas to provide air refueling for SOF aircraft or to air-drop/resupply special operations forces.
WC-130H/J	19	J models flown by AFRC's "Hurricane Hunters" to provide forecasting data for tropical disturbances and storms, hurricanes, and winter storms.
Navy		
C-130T	20	Aircraft provide rapid logistical support to Navy operating forces and transport of personnel and cargo.
Marine Corps		
KC-130T/J	74	Multi-role aircraft capable of air-to-air refueling and transport of personnel or cargo into austere landing zones.
Coast Guard		
HC-130H/J	28	Missions for these aircraft include: search and rescue, cargo and personnel transport, law enforcement, and international ice patrol.

Source: USCG, Office of Aviation Forces website, http://www.uscg.mil/hq/cg7/cg711/c130h.asp; U.S. Navy NAVAIR website, http://www.navair.navy.mil/index.cfm?fuseaction=home.display&key=96163E6F-65F2-42; and USAF REMIS data, February 10, 2013.

History of the C-130

The initial production model was the C-130A. Design studies began in 1951 with the first prototype flight taking place in 1954 followed by the first production flight in 1955.[8] The C-130 is one of the most modified aircraft in history, with hundreds of modifications and variants, but today there are currently two primary models; the H and J models. The H models began delivery in 1974 with more than 350 ordered including eight funded in FY1996.[9] The H models are further delineated as H1s, H2s, H2.5s and H3s. The primary differences in the H models are age (with the H1 being the oldest model) and avionics packages. Production of the H model has ended and been replaced with J models. The J model aircraft include significant advances in avionics and performance. There are currently two major versions of the J model, the C-130J "short" and the C-130J-30 "stretch" model. The stretch model is 15 feet longer and provides 30% more usable volume. The stretch models are used primary for the delivery of troops and cargo, referred to as combat delivery. The short models are assigned primarily as special mission aircraft due to the reduced requirement to carry passengers and cargo. Other than the length they are virtually identical prior to modification so the entire fleet is commonly referred to as C-130Js. The fleet is further identified by the type of mission the aircraft is designed to handle. While a WC-130 is equipped for chasing storms and an AC-130 is equipped for combat support, both are either an H or J model aircraft. The figure below details the C-130 production history.

Figure 3. C-130 Production History



Source: Lockheed Martin Corporation.

[8] "C-130 Hercules," *FAS Military Analysis Network*, February 20, 2000. http://www.fas.org/man/dod-101/sys/ac/c-130.htm.

[9] "C-130 Hercules," *FAS Military Analysis Network*, February 20, 2000. http://www.fas.org/man/dod-101/sys/ac/c-130.htm.

What Is the Right Number of C-130s?

An important question for Congress is to determine how many C-130s are needed in the future to provide desired capability. In determining the desired fleet size an analyst may move away from the discussion of actual aircraft numbers toward a broader question of how much capability is desired to accomplish the missions of the future. A typical question might be how much cargo or how many people must be airlifted to support a specific scenario, like a major land battle, versus how many aircraft a commander may need to achieve the objective. This analysis is typically accomplished by the services but normally returns to a discussion of numbers of aircraft since this can be assigned a monetary value. For the purposes of this report, aircraft numbers will be used to indicate desired capability.

USAF Combat Delivery Fleet

After release of the FY2013 President's Budget, the Air Force submitted a modification to force structure to Congress in November 2012. This Total Force Proposal (TFP) offered an integrated set of modifications to the FY2013 Budget. The TFP requested a fleet of 326 intra-theater aircraft.[10] Additionally, the TFP made the following changes to the FY2013 PB submission:

- reversed the elimination of one ANG and one Reserve C-130H squadron;
- restored some Reserve Component missions performed prior to FY2012 by adding two ANG C-130 squadrons and increasing the size of one ANG C-130 squadron; and
- made adjustments to the FY2012 Active Component force structure by divesting two C-130H squadrons.[11]

The fleet size was modified in the FY2013 NDAA to increase the number by 32 to 358 for FY2013 and allow for 23 prior year approved FY2013/FY2014 C-130 retirements. After retaining the 358 inter-theater airlift aircraft required by the FY2013 NDAA, the Air Force modified the plan to retire only one Active component C-130H squadron.[12] The current USAF plan is to inactivate the 53rd Airlift Squadron at Little Rock and retire their assigned C-130Hs (approximately 14 aircraft).[13]

In order to maintain an inventory of 358 intra-theater airlift aircraft, the Air Force considered options regarding the C-130/C-27[14] fleet mix. The Air Force determined that the requirements of the defense strategic guidance called for 310 C-130 combat delivery aircraft; however, the FY2012 President's Budget projected an inventory of 372 C-130s and 38 C-27s at the end of the Future Years Defense Program.[15] The Air Force analysis identified an excess in intra-theater airlift

[10] Intra-theater is defined in DOD Joint Publication dated September 30, 2013 as airlift conducted within a theater with assets assigned to a geographic combatant commander or attached to a subordinate joint force commander.

[11] DOD, *The Air Force Fiscal Year 2013 National Defense Authorization Act Implementation Plan*, March 2013, pp. 2-4.

[12] Ibid.

[13] HQ USAF/A8.

[14] The C-27J Spartan is a medium sized transport aircraft very similar in appearance to a C-130 but with two engines.

[15] *The Air Force Fiscal Year 2013 National Defense Authorization Act Implementation Plan*, March 2013, p. 6.

which resulted in a strategic choice to request permission to retire 65 C-130H aircraft across the FYDP[16] and divest all 21 C-27J aircraft. These retirements would leave a fleet of 318 C-130s which the Air Force deemed sufficient to meet the requirements levied by the defense strategic guidance, including the Army's direct support requirement.

In the USAF FY2015 budget request, the Air Force requests again to retire excess C-130H aircraft to a total of 318 total combat delivery aircraft in FY2015 but to grow to 328 as the final J models arrive within the Future Years Defense Program (FYDP).[17]

Additionally, as directed by the FY2013 National Defense Authorization Act,[18] the Department of Defense conducted a Mobility Capabilities Assessment (MCA-18) to examine and report to Congress how the planned mobility system supports the guidance in the 2012 Defense Strategy and how much tactical airlift is needed to fill the strategic requirements.

The MCA-18 listed four objectives:

1. Assess the mobility system's ability to support a range of current and future challenges as identified in existing guidance.
2. Identify key constraints associated with deploying and sustaining U.S. forces.
3. Evaluate options to mitigate constraints.
4. Identify possible programmatic actions to align mobility capabilities with current and future challenges.[19]

A summary of the findings as they relate to intra-theater airlift found that no surge scenarios associated with the current defense strategy (even one in which a significant homeland defense event occurs concurrently with two wars) require a fleet of 358 C-130s.[20]

This assessment was further justification to support the Air Force's previous assessments indicating a combat delivery C-130 force closer to 300 would meet current and future requirements.

The Air Force has committed to maintaining the minimum number of C-130 aircraft at 358 for FY2013 and FY2014. The question for Congress is where to set the "floor" for combat delivery intra-theater airlift in the future.

[16] The Future Years Defense Program (FYDP) is the program and financial plan for the Department of Defense as approved by the Secretary of Defense. The FYDP arrays cost data, manpower and force structure over a six-year period (force structure for an additional three years), portraying this data by major force program for DOD internal review for the program and budget review submission. It is also provided to Congress in conjunction with the President's budget. (Source: DOD Financial Management Regulation 7000.14-R.)

[17] USAF, *FY15 Budget Overview,* March 2014, p. 38, http://www.saffm.hq.af.mil/shared/media/document/AFD-140304-039.pdf.

[18] P.L. 112-81.

[19] U.S. Transportation Command, the Joint Staff, and OSD, Cost Assessment and Program Evaluation directorate, co-led the Mobility Capabilities Assessment (MCA-18); the extract is taken from the Executive Summary, December 2013.

[20] The 358 aircraft referenced does not include special mission aircraft.

USAF Special Mission Aircraft

Approximately 152 C-130s have been modified from the traditional airlift mission to support special operations. The Air Force, as described in the proposed Acquisition Program Baseline dated September 27, 2013, plans to recapitalize the entire fleet of AC, MC, and HC-130 special operations aircraft.[21] This includes a proposal to purchase 37 HC-130Js and 94 MC-130Js. Out of the 94 MC-130Js, 37 will become AC-130Js through modifications by U.S. Special Operations Command. There are also 21 EC-130 models, seven of which have been recapitalized as EC-130Js. An issue for Congress is how many of these special mission aircraft are needed to support future requirements.

Navy/Marines

The current Navy Program of Record is 104 aircraft: 79 Marine Corps and 25 Naval Reserve KC-130J aircraft. The Naval Reserves fly the C-130T and the current plan is to retire them on a near one to one basis as new KC-130J models enter service. This will create a homogenous fleet of KC-130J aircraft, although some aircraft may be modified with the Harvest Hawk (Hercules Airborne Weapons Kit). With the Harvest Hawk kit the aircraft has the ability to deliver air-to-ground Hellfire missiles, precision-guided bombs and 30 millimeter auto-cannon rounds.[22] An issue for Congress is whether these levels should be authorized.

Coast Guard

The DHS FY2014 Strategic Context Congressional Justification lists the current Program of Record for 22 Long Range Surveillance aircraft (HC-130s).[23] This number has been consistently mentioned as the Coast Guard requirement. However, with the FY2014 NDAA transferring 14 C-27J aircraft from the Air Force to the Coast Guard, the requirement for 22 HC-130s may change.[24] As the Coast Guard fleet adapts to this recent change, Congress may want to examine the fleet mix and determine what number of HC-130s are required.

Should the Fleet Be Modernized or Recapitalized?

A significant issue in the current C-130 fleet is age of the C-130H models. Years of flight in austere environments, advancing technologies, and aircraft age are catching up to the fleet. The fleet faces part obsolescence issues, fatigue on the aircraft structure, and changing aviation regulations that may impact access to certain areas of the world. The average age of the C-130H fleets in all the services is over 25 years. The figure below shows the breakout in the Air Force.

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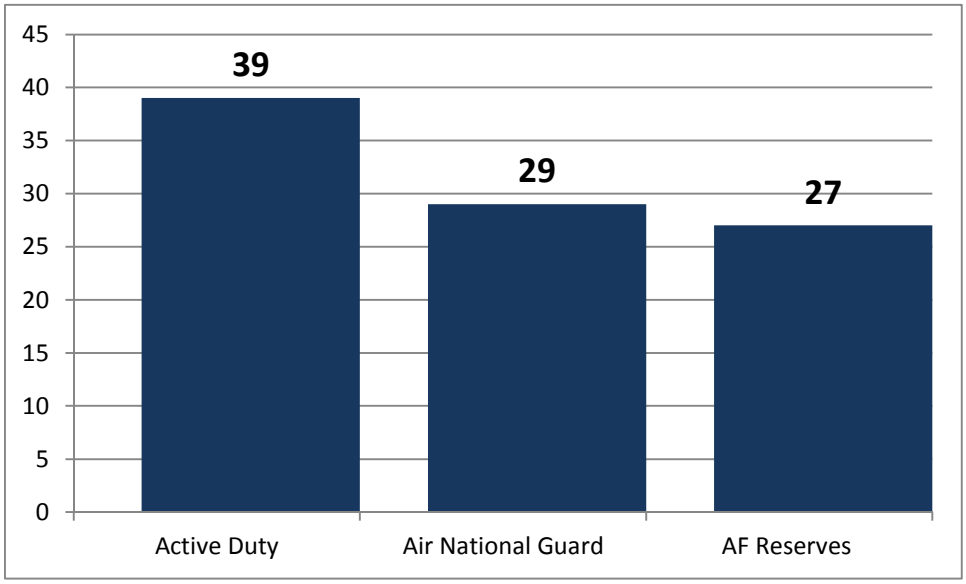
[21] DOD, Defense Acquisition Management Information Retrieval, *Selected Acquisition Report, HC/MC-130 Recapitalization Aircraft*, December 31, 2012, p. 5, http://www.dod.mil/pubs/foi/logistics_material_readiness/acq_bud_fin/SARs/2012-sars/13-F-0884_SARs_as_of_Dec_2012/Air_Force/HC-MC-130_Recap_December_2012_SAR.pdf.

[22] Downloaded from USMC website at http://www.marines.com/operating-forces/equipment/aircraft/kc-130j-super-hercules#features, February 24, 2014.

[23] DHS, U.S. Coast Guard, *FY14 Congressional Justification,* 2013, pp. CG-OE-41, http://www.uscg.mil/posturestatement/docs/congressional_justification.pdf.

[24] P.L. 113-66.

Figure 4. Average Age of C-130H Fleet, by USAF Component



Source: Date extracted from USAF Reliability and Maintainability Information System (REMIS) database January 27, 2014.

Note: Includes Special Mission Aircraft.

As fleets age and aviation rules evolve, aircraft fleet managers are confronted with the choice to modify their current aircraft with new equipment (modernize) or replace the aircraft with new production models (recapitalize). Each option has advantages and disadvantages; a significant driver for both options is cost.

If the decision is made to recapitalize the older aircraft with new planes, cost becomes a major consideration. The current FY2014-FY2018 multi-year procurement lists the cost for 79 C-130J aircraft at $5.8B.[25] While this is a significant investment, new aircraft may produce cost savings over time. The C-130J can carry more cargo, fly greater distances, and incur fewer maintenance costs than the older C-130H models which may create savings in the future.

In choosing modernization over recapitalization there are several issues to address. Most importantly, what components should be modernized? The current fleet has significant structural issues and older C-130Hs will need to modify the center wing box structure to extend their service life at some point. This modification costs approximately $7 million per aircraft. There are also potential problems with the current avionics capability in the C-130H. Within the next several years there are anticipated changes to the international and domestic flight rules with which current C-130Hs cannot comply due to outdated avionics. If no upgrades are performed to the avionics and the rules do change there may be areas of the world, including airspace around busy U.S. airports, that may be inaccessible to C-130H aircraft. The upgrades to the avionics also come with a menu of options that start with minimal capability upgrades to significant overhauls of the current system. The costs will likely rise as more significant upgrades are accomplished.

[25] DOD, *Exhibit MYP-1, Multi-year Procurement Criteria,* April 2013, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2014/PB14_MYPs_and_Revised_MYPs.pdf.

The overall decisions regarding the C-130 fleet are complex with several variables. One approach might be to forecast what the fleet of 2025 might look like and how this supports expected future requirements. If current production rates are maintained, the fleet will have several older model aircraft in the inventory well into the future. If older aircraft are not replaced with new aircraft before obsolescence issues impact capability, concurrent recapitalization and modernization may be the best option to support future requirements.

C-130 Modernization Issues

Older model C-130s currently make up a significant portion of the entire fleet and are the focus of modernization issues. The age of the fleet has created parts and avionics obsolescence issues, along with structural fatigue, that may impact the overall capability of the aircraft in the future.

Diminishing Manufacturing Sources (DMS)

An important consideration for military planners when analyzing an aging aircraft fleet for either recapitalization or modernization is Diminishing Manufacturing Sources and Material Shortages (DMSMS). Defined as the loss of commercial sources of items or material, DMS surfaces when a source announces the actual or impending discontinuation of a product, or when procurements fail because of product unavailability.[26] DMS is a significant issue for the C-130H fleet, primarily because the C-130H has old and outdated avionics; 22% of the avionics are already obsolete according to the Air Force Life Cycle Management Center.[27] This was magnified by the decision to cancel the C-130 Avionics Modernization Program (AMP), which was originally planned to address DMS issues within the fleet. Since the older parts would be replaced with new parts as part of the AMP, the DMS issue faded during the life of that program. When the Air Force attempted to cancel the program in 2012 and airplanes were no longer being modified, the DMS issues again became a rising concern. According to the recent Institute for Defense Analyses (IDA) study addressing C-130 avionics modernization, 75% of the avionic pieces-parts will be considered to be obsolete by FY2023.[28] DMS issues also impact structural components such as the C-130H outer wing box, which is no longer in production.

Avionics

Assuming current international/U.S. regulations for aircraft Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) requirements follow current implementation timelines, a significant portion of the C-130 fleet may be restricted access to certain European airspace as early as 2017. The current fleet of C-130H models do not have the required avionics capabilities anticipated in certain U.S. airspace and in areas surrounding busy U.S. airports as soon as 2020.[29] This may be of particular concern for units stationed at or near these large U.S.

[26] Defense Standardization Program Office, *Diminishing Manufacturing Sources and Materials Shortages Guidebook* (2009), p. 2.

[27] W.L. Greer, D.E. Hunter, and G.M. Koretsky, C-130 Avionics Modernization Analysis, Institute for Defense Analyses, Alexandria, VA, September 2013, p. iii, IDA Paper P-5062.

[28] Ibid.

[29] For more information on specific CNS/ATM requirements reference, "PROP/TURBOPROP Aircraft CNS/ATM and NextGen Requirements Roadmap," prepared by Air Force Aeronautical Systems Center, February 6, 2013.

airports, especially Air National Guard and Reserve units. The table below provides an illustration of how many J model aircraft are expected to join the fleet between FY2014 and FY2018.

Table 2. FY2014-FY2018 Estimated Procurement C-130J Model Aircraft

Organization	Model	Estimated Number Procured FY14-FY18	Current Fleet Size	Current Number of J Model Aircraft
USN/USMC	KC-130J	7	94	46
USAF	C-130J (Combat Delivery)	29	362	99
USAF	HC/MC/AC-130J	43	152	32
USCG	HC-130J	3*	28	6

Source: Lockheed Martin FY14, Congressional Overview Brief, A-13-40407_C-130J_4-29-13, April 2013; USCG, Office of Aviation Forces website, http://www.uscg.mil/hq/cg7/cg711/c130h.asp; U.S. Navy NAVAIR website, http://www.navair.navy.mil/index.cfm?fuseaction=home.display&key=96163E6F-65F2-42; and USAF REMIS data, February 10, 2013.

Notes: USCG has three C-130Js on contract with a priced option for five more aircraft as part of the FY2014-FY2018 multi-year procurements approved by the FY2014 NDAA.

An approach may be to look at the fleet in FY2018 along with guidance on recapitalizing and decide what modernization steps to take. For instance, the USN/USMC is forecasted to have a fleet of 53 J models and 41 H models in FY2018. If the decision was made to continue to replace the USN/USMC H models at a rate of 10 per year, the new regulatory guidance may not be an issue, as there is expected to be some relief from these regulations for aircraft that are retiring. In this case, modernization efforts might be kept to a minimum and resources directed toward recapitalization. However, by FY2018 the USAF combat delivery fleet will still have approximately 250 H models in the inventory, assuming the fleet size remains at current levels. These remaining aircraft may be subject to changing avionics regulations that may limit access to certain airspace.

USAF C-130H Avionics Modernization Program

The most recent C-130 modernization effort in the USAF authorized and appropriated by Congress is the C-130H Avionics Modernization Program (AMP), which began system development in 2001.

AMP Mission and Description

The C-130 Avionics Modernization Program (AMP) consolidates and installs the mandated Air Force Navigation/Safety modifications, the Communications Navigation Surveillance/Air Traffic Management (CNS/ATM) capabilities, and the C-130 Broad Area Review requirements on 221 of the Air Force's Combat Delivery C-130s. These mandated modifications are incorporated with various other reliability, maintainability, and sustainability upgrades to include: installation of fleet-wide radars, aircrew displays, dual autopilots, dual flight management systems and HF/UHF/VHF radios/data links. AMP will allow this fleet complete access to the CNS/ATM-mandated national and international air space for the foreseeable future.

This fleet consists of three (3) different Mission Design Series (MDS) aircraft to be modified by the AMP (C-130 H2, H2.5, and H3). Within each of these MDSs multiple variants exist among the aircraft that will be modified with AMP. Today, these different models and cockpit configurations create significant logistics support and aircrew training inefficiencies. Also, these differences greatly complicate aircrew and aircraft scheduling and interoperability at forward operating locations. C-130 AMP standardizes the cockpit configurations and avionics suites for these different variants into a single cockpit configuration by installing a core avionics package with a common cockpit layout, thus eliminating many of these significant logistics, interoperability, and training problems.[30]

According to DOD, funding instability and problems integrating hardware and software, as well as an Air Force decision to exclude C-130E aircraft from the program, triggered a Nunn-McCurdy unit cost breach in February 2007.[31] The program was subsequently restructured to include far fewer aircraft—221 instead of 519—at a cost $1.8 billion greater than the original program estimate.[32]

The Air Force attempted to cancel AMP in 2012, citing budget concerns. Prior to the decision to cancel the program, development, test, and evaluation on the program was completed including 427 flights and 1,066 flight hours.[33] Currently five aircraft have been modified and delivered along with a flight simulator. *Inside Defense* reported in December that the five upgraded C-130 aircraft effectively remain idle at Little Rock Air Force Base awaiting a decision on the program.[34] The aircraft are being maintained in a flyable status at the base and are being used to train student loadmasters. Because the avionics systems are so different, they are "unusable" for currently trained pilots, flight engineers and navigators.[35] The current policy in the Air Force is for pilots to be qualified on only one model aircraft at a time, with a few exceptions (e.g. test pilots). With the small number of AMP modified planes, new pilots are not being trained to fly them. See appendix for a comparison of C-130 cockpits.

[30] DOD, Defense Acquisition Management Information Retrieval, *Selected Acquisition Report, C-130 AMP*, December 31, 2011, p. 4, http://www.dod.mil/pubs/foi/logistics_material_readiness/acq_bud_fin/SARs/DEC%202011%20SAR/C-130%20AMP%20-%20SAR%20-%2031%20DEC%202011.pdf.

[31] A Nunn-McCurdy breach occurs when a major defense acquisition program experiences an increase of at least 15% in Program Acquisition Unit Cost or Average Procurement Unit Cost above the unit costs in the Acquisition Program Baseline.

[32] GAO report number GAO-10-67 entitled 'Defense Acquisitions: Strategic Airlift Gap Has Been Addressed, but Tactical Airlift Plans Are Evolving as Key Issues Have Not Been Resolved' which was released on November 12, 2009.

[33] Copyrighted PowerPoint briefing provided by Boeing titled, "C-130 Avionics Modernization Program (AMP), November 21, 2013.

[34] "AMPs On The Ramp," *Inside Defense,* December 5, 2013, downloaded from: http://insidedefense.com/Inside-the-Air-Force/Inside-the-Air-Force-12/06/2013/amps-on-the-ramp/menu-id-151.html.

[35] According to Colonel Harold Eggensperger, Commander of the Air National Guard's 189th Airlift Wing, as quoted by Inside Defense, November 2013.

The FY2013 NDAA[36] directed the Secretary of the Air Force to have the Institute for Defense Analyses conduct an independent cost-benefit analysis comparing continuing the C-130 AMP program or upgrading and modernizing the fleet using a reduced scope program for avionics and mission planning systems. The study looked at three alternatives: (1) continue the AMP program; (2) option A; which replaces all cockpit gauges and the current self-contained navigation system (SCNS); and option B, which has fewer avionics upgrades. All three options guarantee they comply with regulations for flying in the U.S. and international airspaces under current rules.[37] As explained in the report, they differ in details with respect to navigation performance, potentially imposing restrictions on aircraft in the future if rules are changed. Option B also does not replace the current SCNS, which will likely need to be replaced in the future to ensure compliance with future aviation rules.

An important point to consider in reviewing this data is that it does not include the approximately $1.7 billion previously spent on the AMP program. The report estimated remaining acquisition cost for each of the alternatives, including research, development, test, evaluation and procurement costs.

In considering alternatives, an issue to consider is also the time it takes to field a new system. The AMP took over 40 months to deliver the first aircraft from contract award.[38]

Table 3. IDA Estimated Acquisition Costs in FY2013 Dollars for Each Alternative

Item	AMP	Option A	Option B	Option B +SCNS Replace
Total Acquisition Cost to Go	$3.15B	$1.75B	$0.62B	$1.57B

Source: W.L. Greer, D.E. Hunter, and G.M. Koretsky, *C-130 Avionics Modernization Analysis*, Institute for Defense Analyses, Alexandria, VA, September 2013, p. iii, IDA Paper P-5062.

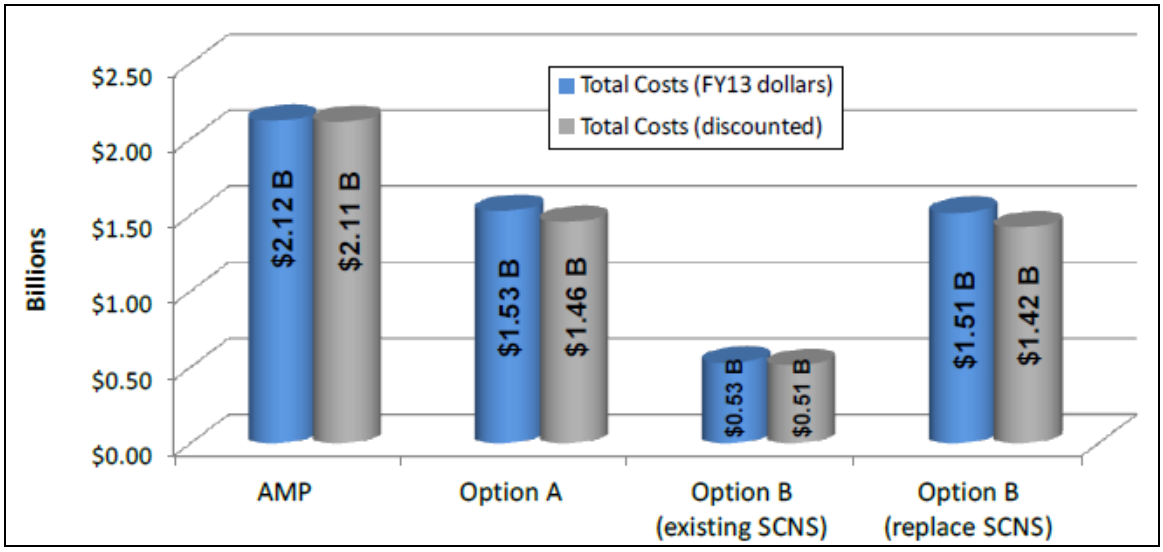
The combined estimated acquisition costs with calculated operations and support savings were used to estimate the 25-year costs in the figure below.

[36] P.L. 112-81.

[37] W.L. Greer, D.E. Hunter, and G.M. Koretsky, *C-130 Avionics Modernization Analysis*, Institute for Defense Analyses, Alexandria, VA, September 2013, p. iii, IDA Paper P-5062.

[38] Boeing Website, *C-130 Avionics and Modernization Program,* downloaded February 2014, http://www.boeing.com/boeing/defense-space/support/maintenance/c130/index.page.

Figure 5. IDA 25 Year Cost for Each C-130H Alternative in Constant Dollars and Net Present Value (Discounted)



Source: W.L. Greer, D.E. Hunter, and G.M. Koretsky, C-130 Avionics Modernization Analysis, Institute for Defense Analyses, Alexandria, VA, September 2013, p. iii, IDA Paper P-5062.

Current Legislative Action on C-130 AMP

The FY2014 National Defense Authorization Act (P.L. 113-66) prohibits the Air Force from taking any action to cancel or modify the avionics modernization program of record for C–130 aircraft; or initiate an alternative communication, navigation, surveillance, and air traffic management program for C–130 aircraft that is designed or intended to replace the Avionics Modernization Program. It further directs the Comptroller General of the United States to submit to the congressional defense committees a sufficiency review of the cost-benefit analysis conducted by IDA by 1 April, 2014. As of May 1st, the draft report has been delivered and is being reviewed by DOD and IDA.

Excerpt from FY2014 NDAA

Prohibition on cancellation or modification of avionics modernization program for C–130 aircraft (Sec. 133)

The House bill contained a provision (Sec. 132) that would prohibit the Secretary of the Air Force from terminating the legacy C–130H Avionics Modernization Program (AMP). The House report accompanying H.R. 1960 (H.Rept. 113-102) of the National Defense Authorization Act for Fiscal Year 2014 recommended an increase of $47.3 million in Aircraft Procurement, Air Force (APAF), to fund modifications of legacy C–130 with the original AMP upgrade. The Senate committee-reported bill contained no similar provision.

The Senate report accompanying S. 1197 (S.Rept. 113-44) of the National Defense Authorization Act for Fiscal Year 2014 recommended an increase of $47.3 million in APAF to fund modifications of legacy C–130 with either: (1) the original AMP upgrade; or (2) an alternative program that would upgrade and modernize legacy C–130 airlift fleet using a reduced scope program for avionics and mission planning systems.

The agreement includes the House provision with an amendment that would add a requirement that the Comptroller General conduct a sufficiency review of the cost-benefit analysis conducted under Section 143(b) of the National Defense Authorization Act for Fiscal Year 2013 (P.L. 112-239), including any findings and recommendations relating to such review. The agreement also recommends an increase of $47.3 million for Research, Development, Test, and Evaluation, Air Force, in PE 41115F for C–130 Airlift Squadrons, pending completion of that sufficiency review. This is in lieu of a recommendation for additional procurement funding in fiscal year 2014, since procurement funding for modernizing C–130 avionics would be premature.

FY2015 USAF Budget Submission

The USAF FY2015 budget submission requests to address C-130H modernization with a reduced scope Communications, Navigation, Surveillance/Air Traffic Management program. The budget overview lists a savings of over $1 billion (total acquisition cost) as compared to the C-130 AMP. This request supports the FY2013 IDA C-130 AMP study recommendation to pursue a reduced scope program although it does not specifically identify an alternative program.[39]

USAF EC-130H Avionics Upgrade Program

For the 14 EC-130H, Compass Call, aircraft stationed at Davis-Monthan AFB, Arizona, the Air Force plans to modernize the avionics. L-3 Platform Integration has selected Rockwell Collins as the avionics solution provider for a CNS/ATM avionics upgrade. The EC-130H CNS/ATM program calls for upgrading the legacy EC-130H aircraft to provide compliance with international CNS/ATM airspace standards meeting necessary calendar year 2020 navigation performance mandates.[40] USAF submitted a proposal in the FY2015 budget to divest 7 of these EC-130H aircraft in FY2016. This may impact future upgrade requirements.

USN Avionics Upgrades

The USN has decided to upgrade its fleet of older C-130T with new avionics to comply with future aviation regulations and provide the aircraft with expanded capabilities. The first of these upgrades was recently completed by BAE Systems, which included replacing 43 obsolete analog gauges with two flat panel digital displays and prepared the aircraft for the follow on Avionics Obsolescence Upgrade (AOU) program.[41] The AOU program is a government integration with software development and select hardware components contracted to Lockheed Martin Mission Systems and Training. Additional elements are provided by the government to be integrated into the final modification. The goal of this approach is to reduce total life cycle costs by leveraging existing modernization programs and proven technology. The program is scheduled to reach initial operational capability with delivery of the first three modified aircraft in 2016.[42] When completed, this modification will bring the USN C-130T fleet into compliance with anticipated future avionics regulatory requirements.

Coast Guard Avionics Upgrades

The Coast Guard is currently upgrading the avionics on the older HC-130 aircraft with the Avionic 1 Upgrade (A1U). The stated objective of A1U is to replace aging/obsolete equipment and update the avionics to comply with the CNS/ATM requirements in the future.[43] The first

[39] USAF, *FY15 Budget Overview*, March 2014, p. 37, http://www.saffm.hq.af.mil/shared/media/document/AFD-140304-039.pdf.

[40] "L-3 Selects Rockwell Collins For USAF EC-130H Avionics Upgrade Program," *Aero News Network,* May 13, 2013, http://www.aero-news.net/index.cfm?do=main.textpost&id=a2f4e78b-b6dc-48a1-84b8-21d45de9ed50.

[41] USN Public Affairs release dated September 6, 2013; http://www.navair.navy.mil/index.cfm?fuseaction=home.NAVAIRNewsStory&id=5448.

[42] Extracted from NAVAIR PMA207, PowerPoint brief, February 27, 2014.

[43] Department of Homeland Security, U.S. Coast Guard*, FY14 Strategic Context Congressional Justification,* p. CG-AC&I-36.

modified aircraft was accepted by the Coast Guard from Rockwell Collins, the primary contractor, in November 2012. As of February 2014, two aircraft have been modified. The Coast Guard stated plans to complete up to four A1U installations on HC-130H aircraft in FY2014.[44] With the addition of new C-27Js and the continued procurement of C-130J models there may be changes to the overall strategy in upgrading these older aircraft.

C-130J Avionics Upgrades

The current avionics upgrades on the C-130J for the USAF, USN, USMC and USCG are being accomplished in a phased approach. The last two phases are the Block 7.0 and 8.1 upgrades.

- Block 7.0 – includes new flight management systems, civil Global Positioning System, Link 16 tactical data exchange, and 23 other items.
- Block 8.1 – includes Mode 5, ADS-B out, Data Links, and seven other items.

In order to better manage the fleet and to avoid simultaneous upgrades the USAF has combined Block 7.0 and Block 8.1 modifications. The development costs are shared via a global Project Arrangement (PA) by the United States (USAF, USMC, USCG), the United Kingdom, Italy, Australia, Denmark, Canada, and Norway.[45] Due to the combining of upgrades, funding for Block 7.0 was combined with 8.1 in FY2014.

Once complete, these upgrades will bring the C-130J fleet into compliance with currently forecasted aviation regulations.

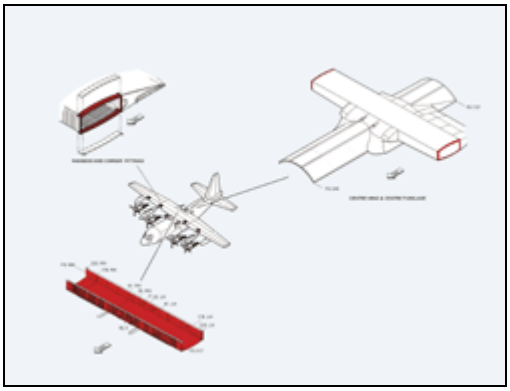
Center Wing Box Modifications

A key issue in any aircraft fleet is the structural service life of the airframe. The structural service life relates the time after production during which the aircraft structural components exceed minimum acceptable safety standards when routinely maintained. Structural service life is impacted by several factors including corrosion, mission severity, and structural fatigue. A major modification currently being accomplished on the C-130 fleet to extend the service life is the replacement of the center wing box, a critical fatigue component of the C-130 fleet due to the stresses of flying missions over such a long period of time. The center wing box is attached to the fuselage and forms the center section of the wing. Two outer wing sections connect to the left and right ends of the center wing.

[44] Department of Homeland Security, U.S. Coast Guard, *FY14 Strategic Context Congressional Justification,* pp. CG-AC&I-36.

[45] DOD, FY14 President's Budget Submission, *Air Force, RDT&E Vol-III Part 2*, April 2013, p. 233, http://www.saffm.hq.af.mil/shared/media/document/AFD-130408-068.pdf.

Figure 6. C-130 Center Wing Box



Source: Downloaded from, http://www.airforce.mil.nz/about-us/news/airforce-news/archive/79/c130upgrade.htm, February 3, 2014.

Note: Illustration depicts Center Wing Box; current modifications also include wing section between outboard engines.

There have been problems historically with fatigue cracking of the center wing on Special Operations Forces (SOF) aircraft in the early 1990s and on the combat delivery fleet in 2000-2005.[46] The fatigue cracking detected on combat delivery aircraft ultimately led to the implementation of strict service life limits that were implemented in 2005. The implementation of these limits led to the numerous aircraft being grounded or restricted in 2005. The center wing replacement modification replaces C-130H center wings with either Extended Service Life (ESL) center wings or standard center wings.

The ESL wing has been the production wing on C-130Js since 2009. To date, 128 center wings have been replaced on USAF aircraft. Fifty center wings were replaced with ESL center wings on special mission aircraft from 1993-2000, and 77 center wings have been modified on special mission and combat delivery aircraft since 2007 with 37 aircraft receiving ESL center wings and 40 aircraft receiving standard center wings.[47] The FY2015 USAF budget requested funding from Congress to continue the center wing replacement program.[48]

The Coast Guard has identified six aircraft to undergo center wing box replacement. The first was completed in August 2012, in partnership with the Air Force.[49] The second is scheduled for November 14, but once again the transfer of the 14 C-27s may impact these modifications as the fleet numbers are changing.

The Navy is currently estimating retirement of the H model aircraft in the Navy prior to them needing center wing box replacements. Based on calculated Equivalent Baseline Hours (EBH)

[46] Email from C-130 Chief Engineer, AFLCMC/WLN, Robins AFB, GA, February 7, 2013.

[47] Modification numbers received via email from C-130 Chief Engineer, AFLCMC/WLN, Robins AFB, GA, February 7, 2013.

[48] USAF, *FY15 Budget Overview,* March 2014, p. 37, http://www.saffm.hq.af.mil/shared/media/document/AFD-140304-039.pdf.

[49] U.S. Coast Guard, Acquisition Directorate, *Coast Guard HC-130H Conversion/Sustainment Project Delivers Prototype Upgrade*, February 14, 2014, http://www.uscg.mil/hq/cg9/newsroom/updates/lrs010713.asp.

derived from a USAF fatigue study, all center wing boxes on Navy KC-130T and C-130T have at least 20 years of life remaining.[50]

The approximate cost per airframe is $7 million and the work is done at Robins Air Force Base in Georgia.[51] This cost may be a consideration when older aircraft that may be scheduled for retirement are maintained on active duty since they will need this modification.

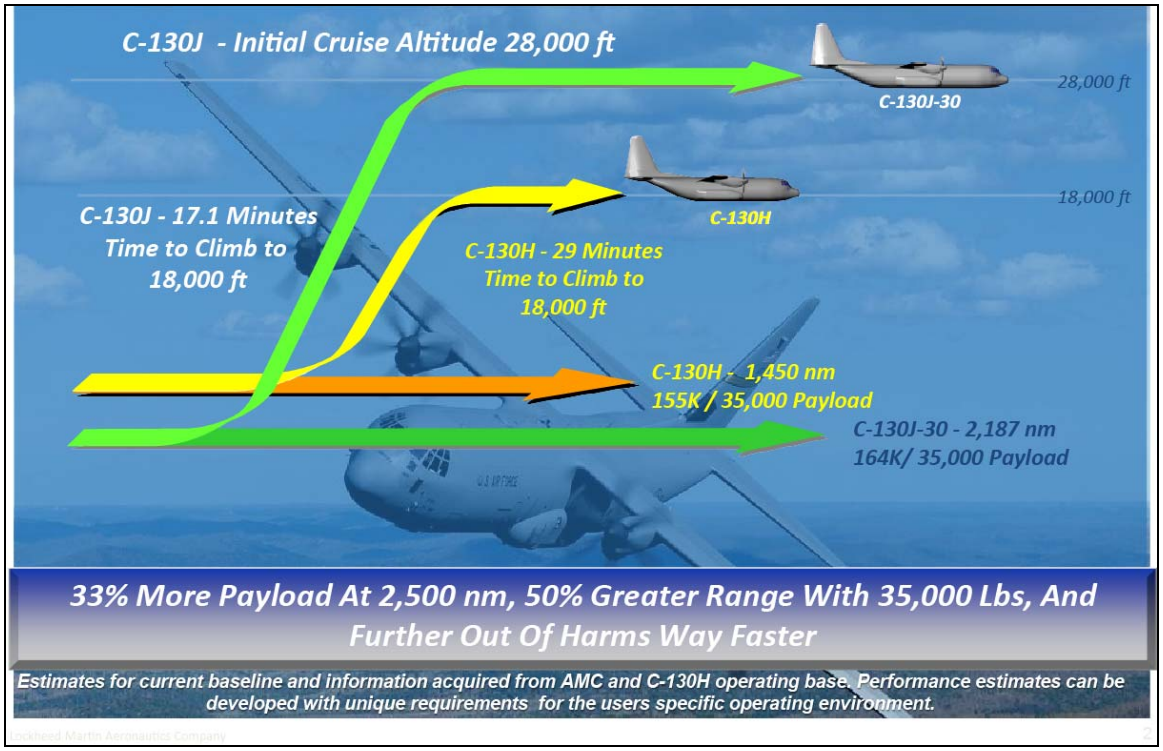
Recapitalization

Current recapitalization efforts center on the C-130J model. The C-130J is the newest model aircraft and the only version still in production. Although similar in appearance to earlier models, the J model has more powerful Rolls-Royce engines and advanced avionics (including a heads-up display) with a digital backbone versus the analog instrumentation on the older H models. Other notable differences, according to the Air Force, include improved reliability, maintainability, greater capacity, and the removal of two aircrew members (navigator and engineer). Deliveries of the first aircraft began in 1999. Since then, over 200 aircraft have been delivered to the U.S. Government. The illustration below gives a review of the increased capability the C-130J provides over legacy models.

[50] USN date received from NAVAIR, PMA207 via email, 27 February 2014.

[51] USAF FY14 Congressional Staffer Brief, "C-130 Modifications", August 2013.

Figure 7. C-130J Performance



Source: Lockheed Martin Corporation.

Multi-year Procurement

The USAF is the lead command for procurement of all C-130J aircraft for the services and the USCG. The current acquisition strategy employed by the USAF is a multi-year procurement for C-130J models.

Multi-year Procurement[52]

Multi-year procurement (MYP) is an alternative to the standard or default DOD approach of annual contracting. Under annual contracting, DOD uses one of more contracts for each year's worth of procurement. Under MYP, DOD instead uses a single contract for two to five years' worth of procurement without having to exercise a contract option for each year after the first year. DOD needs congressional approval for each use of MYP.

To illustrate the basic difference between MYP and annual contracting, consider a hypothetical DOD program to procure 20 single-engine aircraft of a certain kind over the five-year period FY2015-FY2019, at a rate of four aircraft per year:

- Under annual contracting, DOD would issue one or more contracts for each year's procurement of four aircraft. After Congress funds the procurement of the first four aircraft in FY2015, DOD would issue one or more contracts (or exercise a contract option) for those four aircraft. The next year, after Congress funds the procurement of the next four aircraft in FY2015, DOD would issue one or more contracts (or exercise a contract option) for those four aircraft, and so on.

[52] This section adapted from CRS Report R41909, *Multi-year Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress*, by (name redacted) and (name redacted).

- Under MYP, DOD would issue one contract covering all 20 aircraft to be procured during the five-year period FY2015-FY2019. DOD would award this contract in FY2015, at the beginning of the five-year period, following congressional approval to use MYP for the program, and congressional appropriation of the FY2015 funding for the program. To continue the implementation of the contract over the next four years, DOD would request the FY2016 funding for the program as part of DOD's proposed FY2016 budget, the FY2017 funding as part of DOD's proposed FY2017 budget, and so on.

Compared with estimated costs under annual contracting, estimated savings for programs being proposed for MYP have ranged from less than 5% to more than 15%, depending on the particulars of the program in question, with many estimates falling in the range of 5% to 10%. In practice, actual savings from using MYP rather than annual contracting can be difficult to observe or verify because of cost growth during the execution of the contract due to changes in the program independent of the use of MYP rather than annual contracting. The C-130J MYP has an estimated savings of 9.5%.

Benefits of Multi-year Procurement[53]

DOD listed the following benefits to the government from a multi-year procurement, which have generally been accepted without contention:

- **Substantial Savings:** savings for the FY2014-FY2018 listed at $610.6M (TY$) or 9.5%.
- **Stability of Requirement:** the USAF requirement for C-130J procurement is expected to remain unchanged during the multi-year contract period.
- **Stability of Funding:** the Navy and Air Force have demonstrated commitment to a stable funding stream by fully funding the requirement across the Future Years Defense Program (FYDP).
- **Stable Configuration:** the baseline C-130J variant aircraft has been thoroughly tested and certified by the Federal Aviation Administration and the USAF.
- **Realistic Cost Estimate:** prior procurement and previous multi-year procurement on the C-130J variants support the conclusion the pricing is realistic.
- **National Security:** investments in DOD's theater capabilities include ongoing procurement of C-130J aircraft to recapitalize the aging C-130 fleet.

Legislative History

Multi-year procurement has been used previously for C-130 acquisition. The 2003 Department of Defense Appropriations Act (P.L. 107-248 Section 8008), appropriated funds to be used for the multi-year procurement contract for C-130 aircraft. This commitment was for 62 aircraft covering six years of procurement. The MYP was also used in the FY2014 PB request and authorized by the FY2014 NDAA. The FY2014 multi-year procurement encompasses FY2014 through FY2018. The procurement includes 79 C-130J variant aircraft at a total cost of approximately $5.8 billon. The proposed production timeline by variant is listed in the figure below.

[53] DOD, *FY14, President's Budget Submission, Air Force*, April 2013, http://www.saffm.hq.af.mil/shared/media/document/AFD-130408-079.pdf.

Figure 8. C-130J Multi-year Procurement

	FY14	FY15	FY16	FY17	FY18	Total
Quantity	**18**	**14**	**28**	**11**	**8**	**79**
C-130J	6	7	14	2	0	29
MC-130J	4	2	8	5	6	25
HC-130J	1	4	5	3	0	13
AC-130J	5	0	0	0	0	5
KC-130J	2	1	1	1	2	7

Source: Lockheed Martin FY2014, Congressional Overview Brief, A-13-40407_C-130J_4-29-13, April 2013.

In the FY2014 Procurement Exhibits from DOD, the cost savings attributable to the multi-year strategy is estimated at $610.6 million dollars (Then Year $). The total cost of the program is listed at $5.809B (Then Year $).

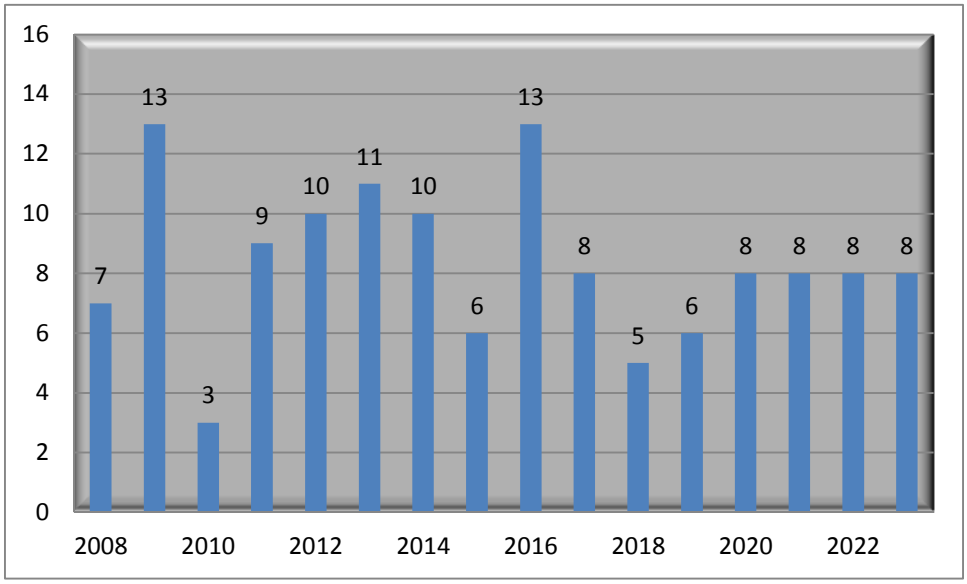
Air Force

For the combat delivery fleet, the Air Force plans to recapitalize the entire active duty fleet. Assuming current guidance remains the same; the active duty fleet would consist entirely of approximately 100 C-130Js by FY2018. While providing general recommendations, the most current airlift analysis, MCA-18, did not list how many of each type of aircraft are required to execute the current defense strategy. The current requirements document for C-130J aircraft, the 2005 DOD Operational Requirements Document (ORD) listed the requirement for combat delivery C-130Js at 155. While the current recapitalization plan appears to fall short of this number, there may be justification to continue procurement of C-130Js beyond the current number of approximately 136 combat delivery models.

The decision whether or not to continue C-130J procurement beyond the current FY2018 MYP is a significant issue for Congress. If USAF plans are met, the current planned number of C-130J combat delivery aircraft will reach 136 aircraft in FY2019 and stop. This would leave the Air National Guard with approximately 24 J models and the Air Force Reserve with approximately 10 J models. If C-130J procurement was to stop at this point, there may be significant interest in what capabilities the future Guard and Reserve C-130H fleets will have. This may be magnified by slowing modernization efforts in the short term.

As previously stated, the Air Force plans to recapitalize the entire fleet of AC, MC, and HC-130 special operations aircraft. This includes a proposal to purchase 37 HC-130Js and 94 MC-130Js. Out of the 94 MC-130Js, 37 will become AC-130Js through modifications. The USAF budget request only includes the FYDP. However, the figure below illustrates the forecasted recapitalization rate of the HC/MC/AC-130s into the future followed by the FY2014-FY2015 USAF Budget Request levels.

Figure 9. AF Proposed Special Operations Recapitalization Rate



Source: Proposed Acquisition Program Baseline, Defense Acquisition Management Information Retrieval, September 27, 2013.

Note: Includes HC-130J and MC-130J Procurement.

Figure 10. USAF FY2015 Budget Request

C-130 Procurement

	FY14	FY15
MC-130	4	2
HC-130	1	4
C-130J	6	7
AC-130J	5	0

Source: USAF, *FY2015 Budget Overview*, March 2014, p. 37, http://www.saffm.hq.af.mil/shared/media/document/AFD-140304-039.pdf.

Note: Request continues Air Force-led joint MYP.

Navy

The Navy plans to recapitalize the entire Navy and Marine fleet with KC-130J aircraft. The current Program of Record is 104 aircraft–79 USMC and 25 U.S. Navy Reserve.[54] Within the

[54] DOD, *Selected Acquisition Report, KC-130J Transport Aircraft,* May 21, 2013, p. 5.

USMC, 51 aircraft are designated as active duty and 28 will be assigned to the Marine Corps Reserve. As of February 2013, 46 KC-130Js had been delivered to the active duty with only 5 remaining to replace the entire active duty force.[55] The 28 remaining Marine Corps Reserve aircraft are scheduled to begin delivery in March 2014. All Navy/Marine Corps KC-130J aircraft are being procured through the C-130J USAF procurement contract.

Coast Guard

The Coast Guard has also plans to recapitalize its entire fleet with HC-130J aircraft. The current fleet has an average age of 28 years, making the HC-130Hs increasingly difficult to maintain and sustain operationally. The current program of record for the Coast Guard is for 22 HC-130Js.[56] To date; six have been delivered and are stationed at Air Station Elizabeth City, North Carolina. The next three are schedule to be delivered to Air Station Barbers Point, Hawaii.[57] This number has been consistently mentioned as the Coast Guard requirement. With the FY2014 NDAA transferring 14 C-27J aircraft from the Air Force to the Coast Guard, this requirement for 22 HC-130s may change.[58]

USAF Aircraft Retirement and Force Structure

In the current debate over strategy, and in the context of current budget limitations, opportunities may emerge to analyze the current force structure and decide how much tactical airlift is required to achieve national goals. While not suggesting a specific number, the MCA-18 analysis did determine that there is currently a surplus of capability in the C-130 fleet. This position was reiterated recently by the then Commander of Air Mobility Command, General Paul Selva. "My position is that the fleet itself is affordable. It's how we deploy the fleet and who operates it," he said. While "there is disagreement on the total numbers, I think we'll land right about the 300 number," he said. This would be a reduction of approximately 40 aircraft. He also suggested adjustments to the Air Mobility Command force structure. His preference was to preserve the actual aircraft in the inventory and achieve savings by changing how they are operated including moving some to the Guard and Reserve.[59]

A major consideration when adjusting the fleet size or mix is the resultant Active, Guard, and Reserve mix. The MCA-18 report cautions that any adjustments should be made with due consideration to that mix and with dwell rates[60] in mind. Both divesting aircraft and transferring them between components involves both financial and political considerations but, from the

[55] Lockheed Martin Brief; "USMC KC-130J Combat Tanker," vol. A13-40407_C-130J_2014 (February 2014).

[56] "Department of Homeland Security, United States Coast Guard," *FY 2014, Strategic Context Congressional Justification,* pp. CG-OE-41.

[57] Lockheed Martin Brief; "USGC HC-130J Search and Rescue," vol. A13-40407_C-130J_2014 (February 2014).

[58] P.L. 133-66.

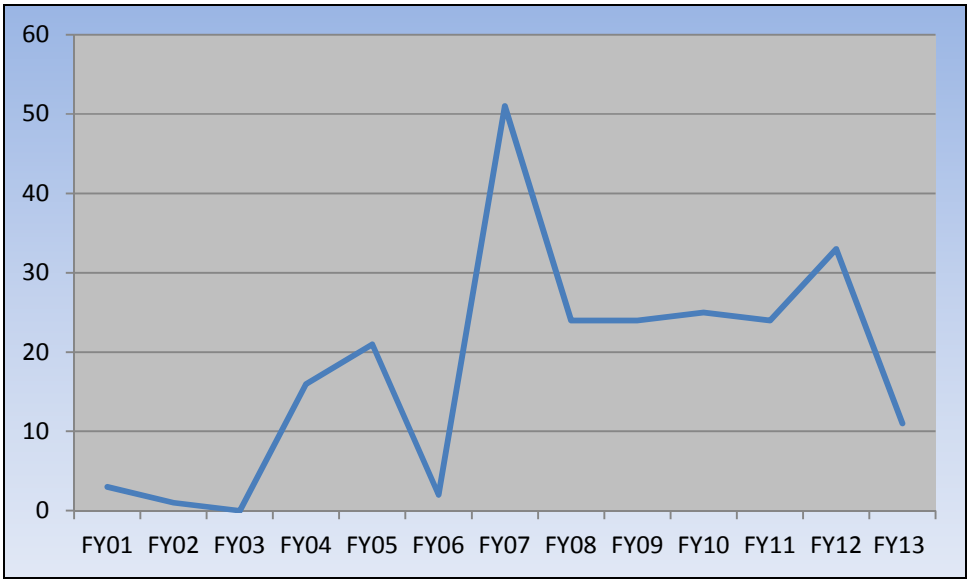
[59] Remarks by General Paul Selva on September 17, 2013 at the AFA 2013 Air and Space Conference, Washington, DC.

[60] Dwell rates refers to how DOD manages aircrew. The current guidance for active duty service members is to spend one period of time deployed followed by two periods at home station. For reserve component service members the guidance is one period mobilized followed by five periods of time at home station.

perspective of implementing national strategy, perhaps the most important consideration is maintaining the proper capabilities mix to meet future requirements.

One important variable in determining future force structure is the rate of aircraft retirement. The following chart illustrates the historic rate at which the Air Force has retired aging C-130s. In recent years the rate has declined in part due to congressional limits on force structure. If the rate continues at a relatively low level, the Air Force may be challenged with continuing costs associated with maintaining the aging fleet.

Figure 11. USAF C-130 Retirements FY2001-FY2013



Source: Data obtained from USAF/A8PM.

Note: Data includes Special Mission Aircraft.

Air Force Basing

C-130 basing has been a contentious issue. Over half the states in the country have a C-130 unit within their borders. The states with C-130 Air Guard units are also assigned responsibilities within the state. Balancing the roles and missions of each unit and how they support the defense strategy directly influences basing decisions. With some C-130 Air National Guard bases employing over 1,000 civilians in support of the base operations, it is a major concern when force structure and basing issues are addressed. There may be opportunities to address force structure concerns by creating or growing associate units. However, the Air Force does not appear to be moving in that direction.

Associate Units

Unit associations link Reserve component units to active duty units. The goal is to combine unit strengths and increase overall effectiveness. For instance, the active duty has young pilots who need training and the Reserve component typically has a very experienced pilot base. Matching these two units may result in some synergies in regards to pilot training. There are three types of unit associations within the Air Force:

- **Classic associate:** A regular Air Force unit retains principal responsibility for a weapon system or systems and shares unit equipment and aircraft with one or more reserve component units. Under the classic associate structure, active-duty and reserve units retain separate organizational structures and chains of command.
- **Active associate:** A reserve component unit has principal responsibility for a weapon system or systems and shares unit equipment and aircraft with one or more regular Air Force units. Active duty and Reserve units retain separate organizational structures and chains of command.
- **Air reserve component (ARC) associate:** Two or more air reserve component units integrate with only one retaining principal responsibility for the weapons system or systems. Each unit retains separate organizational structures and chains of command.[61]

In 2007, the Air Force, in an effort to achieve more cooperation between Active and Reserve forces and in response to the 2005 Base Realignment and Closure Directive, directed the first Air Force Reserve C-130 unit to form an active association with an active duty unit at Pope Air Force Base. The current force structure utilizes the Active Association at the following bases:

- Keesler Air Force Base, Mississippi (Air Force Reserves, C-130Js);
- Little Rock Air Force Base, Arkansas (Air Force Reserves, C-130Hs);
- Cheyenne Air National Guard Base, Wyoming (Air National Guard, C-130Hs);
- Peterson Air Force Base, Colorado (Air Force Reserves, C-130Hs); and
- Pope Field, North Carolina (Air Force Reserves, C-130Hs).

As part of the FY2015 Budget Request, the USAF is proposing closure of the Active Associations at Peterson and Cheyenne and drawing down the two units by 4 C-130H each in FY2015. [62] Additionally, the Air Force is requesting retirement of the C-130H aircraft at Pope Field in FY2014 and to move the C-130J aircraft (the WC-130Js would remain) at Kessler to Little Rock. If these moves are approved the overall concept of the active association in the C-130 fleet may be significantly altered.

Adding to the discussion of associations is the current rate of recapitalization of the active duty C-130H force. There may be no C-130H aircraft assigned to the active duty as soon as FY2018. Current USAF policy is for pilots to qualify in either the H model or the J model C-130s, but not both. This may decrease the availability of H model aircraft since active duty aircrews will not be qualified to fly them if demand increased.

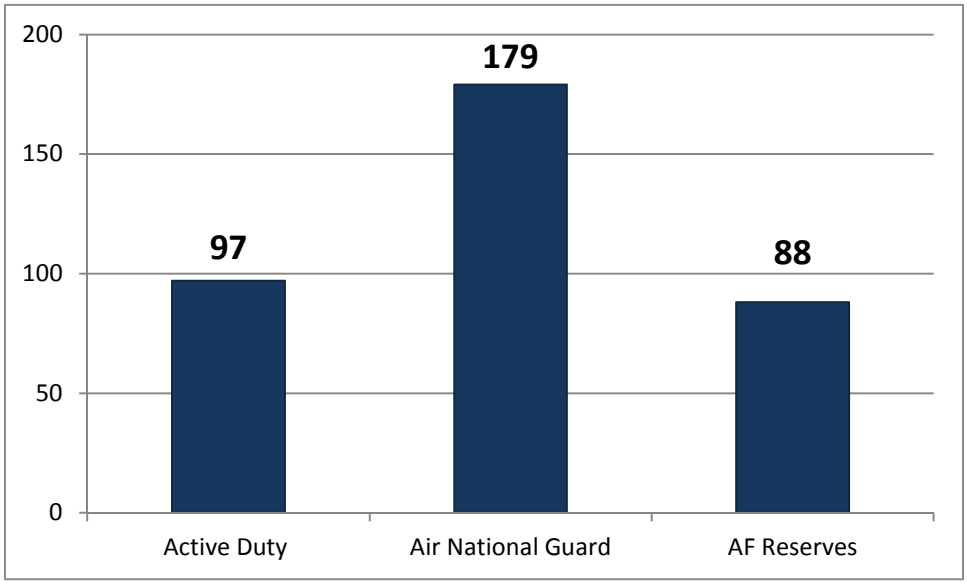
The Air Force FY2015 budget proposal has significant impacts on Guard and Reserve basing by closing some Active Associates and reducing aircraft at several bases. Additionally, as the active duty Air Force transitions to an all C-130J fleet there may be significant impacts on Reserve Component training, maintenance, operations, and manning.

[61] Definitions taken from the Glossary of Air Force Reserve Terms, posted 8/7/2013 found at http://www.afrc.af.mil/library/factsheets/factsheet.asp?id=13900.

[62] "AF Officials Announce FY15 Force Structure Changes," *USAF Website,* March 10, 2014, http://www.af.mil/Portals/1/documents/news/FY15ForceStructureStateSlide.pdf.

The distribution of combat delivery C-130s assigned to the active duty, Air National Guard, and Air Force Reserves has recently been the focus of congressional oversight hearings and generates several concerns regarding force structure and manning. The distribution of these aircraft is illustrated in the figure below.

Figure 12. USAF C-130 Combat Delivery Distribution



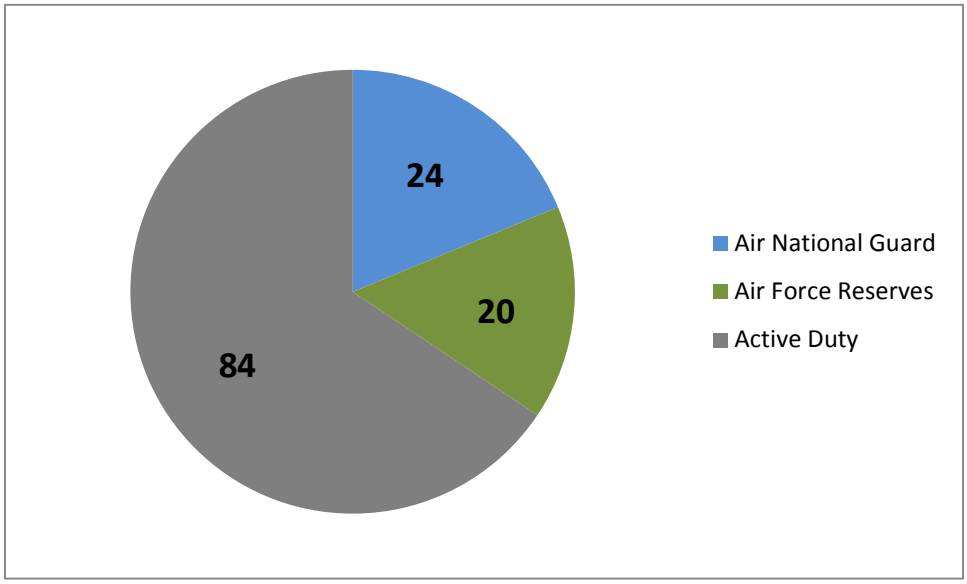
Source: USAF/A8PM current as of January 2014.

Note: Chart includes only combat delivery C-130 aircraft.

Active Duty/Reserve Component Operational Mix

Operational mix refers to how different capabilities are combined to achieve the desired overall effect in accomplishing the military mission. In regards to a fleet composed of different variants of the same aircraft, how they are distributed between the components affect how they support the overall mission. As new production aircraft enter service, debate arises on which units will receive the newest aircraft. In terms of fleet management, it is generally more economical to recapitalize units as a whole rather than to assign aircraft piecemeal throughout the force. In the 1980s-90s the Air Force recapitalized a large portion of the C-130E fleet with new C-130H models. The majority of these new aircraft went to Reserve component units leaving the older C-130E aircraft in the Active component. When the C-130J production began, a large number of these aircraft were assigned to the active duty to replace the aging C-130E aircraft. This began a disparity between the Active and Reserve component fleets which remains today. If current plans are followed, that disparity will grow. The figure below illustrates where the newer C-130J combat delivery aircraft are being assigned with the USAF.

Figure 13. Distribution of USAF C-130J Aircraft



Source: Data extracted from USAF REMIS database January 27, 2014.

Notes: Numbers reflect a snap shot in time of unit possessed aircraft and include special missions aircraft. The current USAF plan is to continue placing production J models in the Active Duty force through FY2018.

Current Studies

Three current studies address the Active versus Reserve component mix.

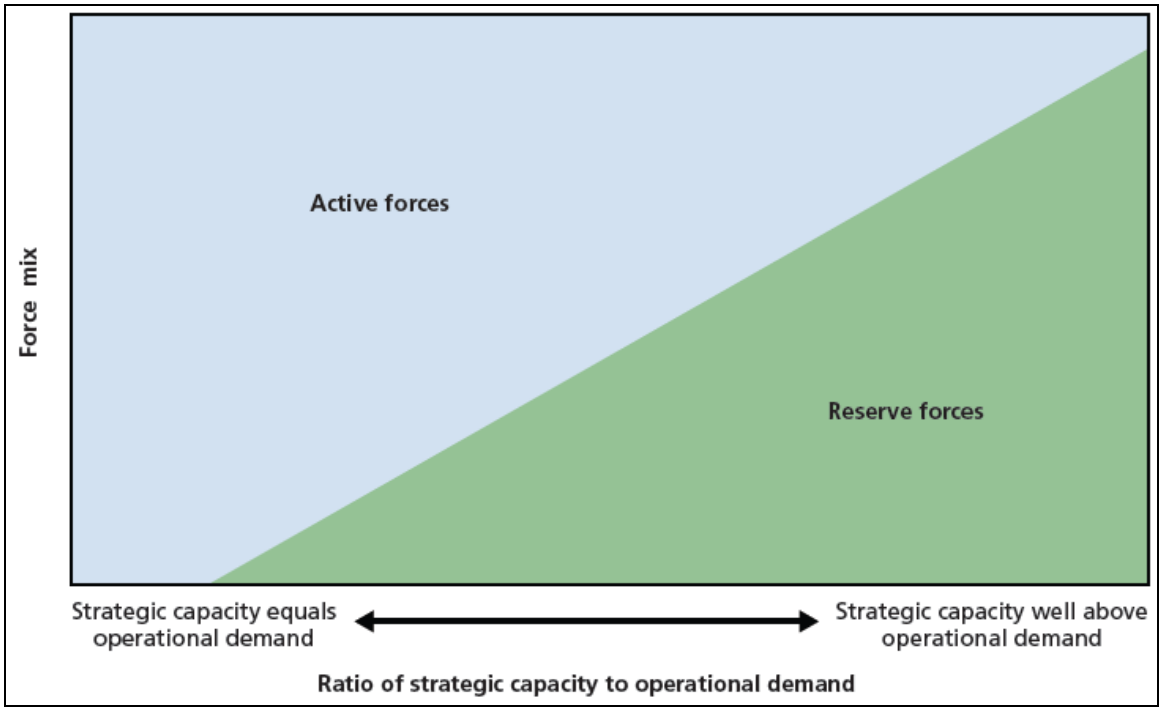
- A 2013 Rand study titled "Costs of Flying Units in Air Force Active and Reserve Components" explored a methodology based on cost using aircraft inventory and flying hour data and offered the conclusions illustrated in the figure below.[63] In regards to the C-130 combat delivery fleet, strategic capacity would be the ability to launch aircraft and deliver passengers and cargo. The operational demand would be how many passengers and cargo the user must deliver and the force mix refers to the number of Active versus Reserve forces. The report suggested that in an environment in which capacity exceeds demand, the more cost effective force mix favors the Reserve Component (RC) conversely if demand exceeds capacity a larger Active Component (AC) force would be more favorable. The study goes on to say that, generally speaking, for the purposes of meeting strategic surge demand, RC units provide mission-ready aircraft with competent aircrew and maintenance workforces at a lower cost than AC units. However the complementary depth and capacity provided by the RC units is offset by the agility and responsiveness relied upon in the AC. [64] The report suggested that from a cost perspective, the nation is well served by a sustained Active Component/Reserve Component mix. The illustration below is a graphical representation of the Active and Reserve force mix; how far up or down the

[63] Albert A. Robbert, *Cost of Flying Units in Air Force Active and Reserve Components*, Rand Corporation, 2013, http://www.rand.org/pubs/technical_reports/TR1275.html.

[64] Ibid.

diagonal line one sets the force posture determines the operational mix of force. The challenge for Congress is determining this tradeoff between the agility of the Active force and the depth/cost of the Reserve Components.

Figure 14. Strategic Capacity, Operational Demand, and Ideal Force Mix



Source: Robbert, Albert, "Cost of Flying Units in Air Force Active and Reserve Components", Rand Corporation, 2013.

- The USAF Mobility Capabilities Study (MCA-18), while addressing options to mitigate constraints on airlift capability, did not recommend any changes to the current force structure but offered some considerations if greater support to daily operations over sustained periods is desired. Taking into account that only 33% of the C-130s and 43% of the aircrew are in the active component, two options for consideration were given.

  1. Adjust Active Component (AC)/Reserve Component (RC) Mix: Increase the ratio of active duty aircraft and flight crews. This alternative increases the capability of a fleet during periods of long-term steady state operations without altering the fully mobilized capability. [65]

[65] Steady-state is defined as cumulative day-to-day activities that are outside of major surge operations. Surge is defined as a condition, which requires forces to be provided to support Combatant Commander operations beyond routinely scheduled activities and results in exceeding Secretary of Defense and Military Department rotation planning goals or Reserve Component access policies in order to meet that demand. The definition of steady-state and surge are drawn from the Guidance for the Development of the Force; http://www.dtic.mil/cjcs_directives/cdata/unlimit/3210_06.pdf.

Returning to the graphic above, if the force is continually tasked (move left on the diagonal line), even below surge levels, the availability of the RC on short notice could become an issue, making a case for more AC forces. The reverse is also true. If the assumption is made that future steady state operations will be less demanding, the case for more RC forces is strengthened. The statement regarding mobilized capability refers to the assumption that RC forces are not activated during the long-term steady state operation. If the RC forces were activated, then dwell-rates may increase costs.

2. Create More Associate Units: If greater access to C-130 aircraft is needed to meet daily operational demands over sustained periods, the creation of more associate units in which AC flight crews are assigned to fly RC aircraft is a reasonable option. This would increase access to RC aircraft without significantly altering the current AC/RC mix.

Again the assumption is that a continually tasked force would experience difficulty with RC availability and more specifically aircrew availability. If AC aircrews are assigned within the RC unit they would be able to augment the RC aircrew and increase availability of the aircraft since there will be more crews available to fly.

- The National Commission on the Structure of the Air Force was created by the FY2013 National Defense Authorization Act. This commission released its findings January 30, 2014. While not directly addressing C-130 units, the commission did make a number of recommendations favoring an increased utilization of the Air Reserve Component. The commission also recommended integration of units currently structured under classic or active associations in order to reduce redundant organizational overhead. If this recommendation were to be adopted, the current C-130 active associations would integrate Active and Reserve component members under one organization. The commission goes on to recommend legal and policy revisions that if made would positively impact an organization of this type. The commission specifically recommended changes to 10 U.S.C. regarding the roles, responsibilities, and functions of the Reserve components. The report recommends that the Active Component force structure should comprise no less than approximately 55% of the Total Air Force end strength. In terms of the Air Force C-130 combat delivery fleet, the USAF currently far exceeds this recommendation with close to 70% of the aircraft assigned to the Reserve Component. The commission also recommended that the Air Force consider, and Congress allow, the closing or warm basing of some installations.[66] A few of the recommendations that pertain to the AC/RC mix follow:
  - In the FY2015 National Defense Authorization Act and Defense Appropriations Act, Congress should allow DOD increased flexibility in applying budget cuts across budget categories, including installations;
  - The Air Force should consider, and Congress should allow, the closing or warm basing of some installations;

[66] The report defined a warm base as an installation with operational forces no longer assigned to it that is maintained for rapid re-occupation.

- To ensure the Air Force leverages full capacity of all components of the force, in its FY2016 Program Objective Memorandum, the Air Force should plan, program, and budget for increased reliance on the Reserve Components. The commission recommends: (1) the Air Force should include in all future budget submissions a specific funding line for "operational support by the Air Reserve Component" to clearly identify those funds programmed for routine periodic employment of the ARC either as volunteers or under the authority of 10 U.S.C. §12304b; (2) in its future budget submissions the Air Force should program for approximately 15,000 man years of operational support annually by the Air Reserve Component; (3) in succeeding years, the Air Force should monitor the execution of this program element to ensure it is utilizing the Air Reserve Component to its fullest extent;
- The Chief of Staff of the Air Force should direct the integration of Air Force Reserve associations of flights, squadrons, groups, and wings into corresponding Active Component organizations in order to eliminate the current redundant organizational overhead found in classic associations; and
- The Chief of Staff of the Air Force should direct the integration of Air Force flights, squadrons, groups, and wings into corresponding Air National Guard organizations in order to eliminate the current redundant organizational overhead found in active associations. [67]

Manning Implications

Modernization or recapitalization decisions will likely have manpower implications throughout the USAF components. The C-130J models have a crew size of three. This includes two pilots and a loadmaster. The current C-130H models have a minimum crew of five, adding a navigator and an engineer to the crew. There are modernization options (like AMP) that eliminate the requirement for the navigator on C-130H models. Additionally, recapitalizing a unit with C-130Js would eliminate the need for engineers and navigators as well as a percentage of whatever manpower support functions the base has for these positions. Hence, recapitalization or modernization decisions will likely impact base manning requirements at some level.

Industrial Base Concerns

Lockheed Martin Aeronautics Company has been the primary contractor for the C-130 since the first production contract for two YC-130A prototypes in September 1952.[68] The assembly of all C-130s takes place at Air Force Plant #6 in Marietta Georgia on Dobbins AFB. The following chart is a list of the contractor and government activities for the C-130 program.

[67] For more information on the National Commission on the Structure of the Air Force see report dated January 30, 2014.

[68] *Jane's Aircraft Upgrades,* February 4, 2013, https://janes.ihs.com/CustomPages/Janes/DisplayPage.aspx?DocType=Reference&ItemId=+++1337502&Pubabbrev=JAU_ (subscription required).

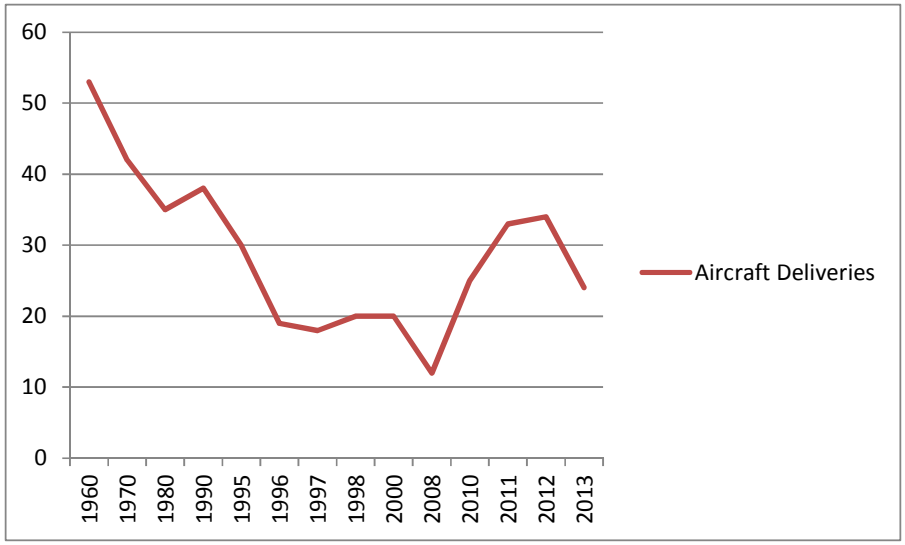
Figure 15. C-130J Contractor/Government Activities

Organization	Location	Role
Prime contractors		
Lockheed Martin Aero	Marietta, GA	Design; final assembly
Major subcontractors		
Rolls Royce	Indianapolis, IN	Engines
Dowty	United Kingdom	Propellers
Lockheed Martin Information Systems/CAE	Orlando, Fl / Tampa, FL	Trainers
Government field activities		
Aeronautical Systems Center	WPAFB, OH	Aircraft procurement, block upgrades
Warner Robins Logistics Center	Robins AFB, GA	Aircraft sustainment
412th Test Wing	Edwards AFB, CA	Flight Test

Source: Data obtained from SAF/AQQU Staffer Brief dated August 2013.

A potential issue with the C-130 program is the long lead times associated with production. Some parts have two year lead times that create instability in both the main and subsidiarity production lines unless the output is forecasted accurately. As illustrated below, there has been variation in the production of C-130s throughout the years.

Figure 16. Lockheed Total C-130 Deliveries, by Year



Source: Lockheed Martin PowerPoint, reference # A13-40407_C-130J_4-29-13.

Note: C-130J deliveries began in 1995.

The multi-year procurement process has the potential to reduce the instability of annual C-130 deliveries and provide Lockheed Martin with a predictable schedule. With procurement schedules exceeding two years, they may also reduce the DMS issues by providing suppliers with a stable build rate. There are approximately 750 part numbers with lead times greater than 24 months and approximately 7,700 part numbers with lead times greater than 12 months as listed in the DOD funding Exhibit MYP-1. Based partly on these extended lead times, Lockheed is attempting to stabilize their production line at 24 aircraft per year.[69] This number includes U.S. and foreign aircraft deliveries. The following charts illustrate Lockheed's USG program status in regards to the number of aircraft order/delivered and the remaining backlog.

Figure 17. U.S. Government C-130 Program Status

Orders	Requirement	Ordered/Delivered	To/Go Orders
USAF (J-30)	134	134	35
USAF (HC-130J)	37	37	22
USAF (AC/MC-130J)	94	94	67
USMC AD (KC-J)	51	51	3
USMCR (KC-J)	28	28	28
USNR (KC-J)	25	25	25
USCG (HC-J)	22	22	13
Total	391	391	193

Source: Lockheed Martin PowerPoint presentation, provided via email November 2013.

Note: To/Go Orders are the number planned to be delivered to meet stated requirements.

Foreign Sales

Currently Lockheed has orders for C-130Js from 15 foreign countries. These foreign sales also allow for a robust production schedule by maintaining the aircraft output at predictable levels.

Table 4. Lockheed Foreign Program Delivery Status

Country	Ordered	Delivered	Backlog
UK	25	25	0
Australia	12	12	0
Italy	22	22	0
Denmark	4	4	0
Norway	4	4	0
Canada	17	17	0
India	6	6	0

[69] Lockheed Martin C-130J Programs PowerPoint, reference #A13-40407_C-130J_2014.

Country	Ordered	Delivered	Backlog
Qatar	4	4	0
Iraq	6	6	0
Oman	3	1	2
Tunisia	2	1	1
Israel	3	0	2
Kuwait	3	0	3
Korea	4	0	4
Saudi Arabia	2	0	2

Source: Lockheed Martin PowerPoint, reference # A13-40407_C-130J_4-29-13.

From an industry base standpoint, if the C-130 program continues at the currently anticipated rate the production line is likely to remain stable well into the future.

Options for Congress

The C-130 fleet has provided the U.S. government with a versatile and relevant capability to achieve national objectives for decades. The issue for Congress is how to provide oversight and appropriations for this aging fleet and maintain the desired capabilities into the future. The following issues are provided for consideration.

Continue to Recapitalize the C-130 Fleet at the Current Level

The ability to rapidly deploy and sustain military capabilities throughout the world in support of U.S. national interests will likely be a key aspect of U.S. strategy well into the future. If so, the issue for Congress is more how than whether to maintain this capability. The recent authorization and appropriation of the C-130J MYP will recapitalize a large portion of the fleet. However, at the end of the current commitment in FY2018 over 400 C-130H aircraft will still be in the inventory, assuming current policy does not shift substantially. A decision for Congress is whether to continue C-130 recapitalization beyond the current MYP. USN, USMC, and USCG have stated the desire to recapitalize their entire fleets. USAF has also stated the desire to recapitalize the special missions fleet but has not been as definitive on the combat delivery fleet. The current request falls well short of replacing all the combat delivery aircraft, specifically the aircraft assigned to the Air Guard and Reserves. If the decision is made to stop C-130J combat delivery aircraft at 136 in FY2019 and the remaining C-130H fleet is not substantially modified, the fleet could be subject to obsolescence issues which may impact the overall capability of the USAF.

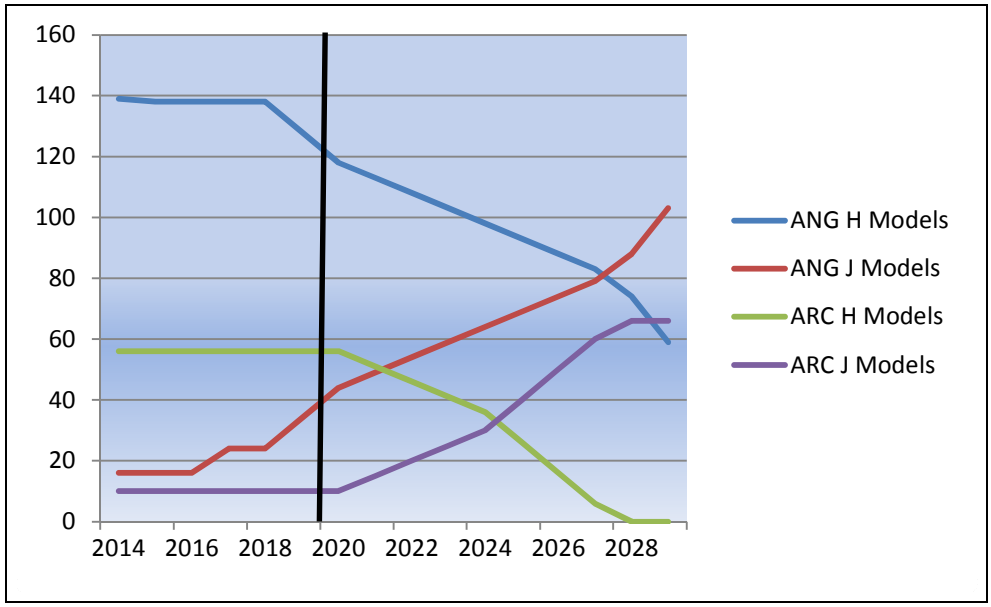
Speed Up C-130J Procurement

If Congress decides to continue recapitalization the issue remains as to how quickly the airplanes can be produced. Lockheed Martin has expressed the desire to maintain the production rate at 24 aircraft per year. However, the production facilities have historically produced aircraft at a higher rate. If the production line maintains the 24 aircraft a year rate, the number of aircraft delivered to the U.S. government may be approximately 15 a year taking into account foreign sales.

Referencing the chart below, if that production rate is maintained past the current multi-year commitment ending in FY2018, approximately 80 H models remain in the fleet in the 2028 timeframe. This chart also assumes a gradual reduction in the size of the fleet that may not occur.

Figure 18. Theoretical Recapitalization Rate

Air National Guard and Air Reserve C-130 Combat Delivery Aircraft



Source: Distribution data derived from USAF REMIS database.

Notes: Model assumed fleet size of approximately 328 with a recapitalization rate of approximately 15 aircraft a year. Data is theoretical, actual data is subject to strategic guidance regarding the fleet size and distribution. Black line represents the planned introduction of National Airspace regulations that may impact non-modernized C-130s.

Based on a production rate of 24 aircraft per year, there may be a significant fleet of C-130H models well into the future. The remaining aircraft, if not modified, would be subject to obsolescence issues and changing aviation rules which may limit their access to airspace in the busiest parts of the world.

Continue AMP Program or Pursue an Alternative Solution

In 1998, the USAF released a C-130 Tiger Team Final Report citing concerns over aging avionics and the need to modernize the fleet to comply with federal and international airspace regulations. These issues remain in the current C-130H fleet. The AMP was the planned solution to obsolescence issues before it was cancelled by the USAF. The challenge for Congress is how to address the growing problem of obsolescence and sustain a fleet that will maintain the future desired capability.

The IDA study addressed the future cost of three independent modernization options. While cost was not the only issue addressed, IDA's analysis illustrates that AMP in its current form may not be the most cost beneficial program. However, there remains a need to address the future obsolescence of the current C-130H avionics suite. There may be opportunities, based on current guidance, to request individual waivers to the avionics requirements if the individual aircraft

identified are to be retired by 2025. This may allow for a portion of the fleet to remain unmodified; however, unless current retirement rates change substantially, a large number of aircraft will need some form of modernization to maintain the same access they have today.

The issue for Congress is how to develop the way forward in regards to C-130 avionics modernization. If the AMP is cancelled and avionics modernization is a priority, another program may need to take its place. In considering alternatives, an issue to consider is the time it takes to field a new system. The AMP took over 40 months to deliver the first aircraft from contract award.[70] Perhaps a scaled down version of the AMP program may be investigated with either fewer aircraft upgraded or fewer modifications installed, or an entirely new program with an emphasis on timely upgrades to essential equipment.

Begin Researching Alternative Options to Provide Tactical Airlift Capability

The USAF has been recapitalizing the C-130 fleet on a sole source basis with Lockheed Martin as the primary contractor. While this strategy is driven by an assessment of technical and programmatic risk to the government, the requirements for tactical airlift may change in the future as technological advances are made. New requirements may drive the need for future studies on the tactical airlift force of the future. These future requirements may lead to an interest in investigating new alternatives to provide the capabilities required. As next generation capabilities develop, perhaps the next tactical airlifter (C-X) will be able to provide expanded capabilities that may change the way the military views tactical airlift.

Adjust C-130 Combat Delivery Force Structure

Each flying unit in the USAF is authorized a Primary Assigned Aircraft (PAA) number. This number forms the primary authorization for allocating resources such as manpower, flying hours, and maintenance costs. Any aircraft assigned to a unit above the PAA number are classified as Backup Aircraft Inventory (BAI). The BAI aircraft are available to fly, however the unit does not receive resources to support them. The FY2013 NDAA directed an inter-theater airlift "floor" of 358 C-130 aircraft.[71] Within the 358 number is approximately 27 C-130Hs and six C-130Js classified as BAI. These BAI aircraft are spread throughout the Air National Guard and Reserve units with most units having one or two aircraft. The Air Force has listed the C-130 combat delivery requirement at not greater than 310 as well as their intention to maintain the fleet at 358 through FY2014. [72] Since 33 aircraft are currently being carried without allocated resources there could possibly be an opportunity to reduce the fleet size by retiring BAI aircraft without severely impacting unit missions as early as FY2015. However, as aircraft are retired there may be a loss of capacity at these bases due to the reduction in available aircraft.

[70] Boeing Website, *C-130 Avionics and Modernization Program,* downloaded February 2014, http://www.boeing.com/boeing/defense-space/support/maintenance/c130/index.page.

[71] The 358 number does not include Special Mission aircraft.

[72] Information obtained from USAF"FY13 Intra-Theater Airlift Congressional Overview" PowerPoint Brief dated March 13, 2013.

Table 5. PAA/BAI List for Units with BAI Aircraft

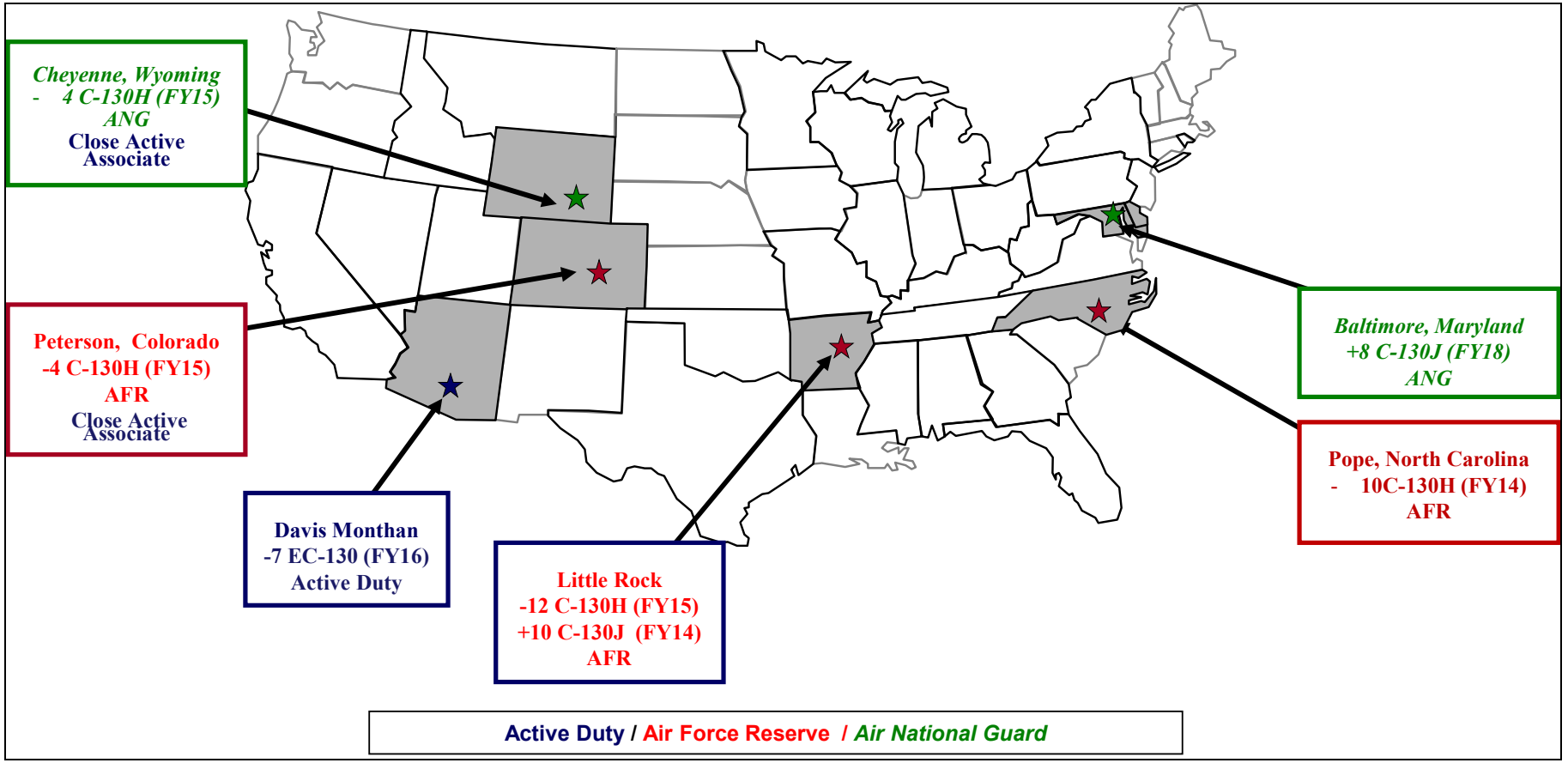
Air National Guard	PAA/BAI	Air Force Reserves	PAA/BAI
Carswell, TX	8/1	Little Rock, AR	12/2
Charlotte, NC	9/1	Niagara, NY	8/2
Elmendorf, AK	8/1	Peterson, CO	12/1
Little Rock, AR	12/4	Youngstown, OH	8/1
Louisville, KY	8/2		
New Castle, DE	8/1		
Peoria, IL	8/1		
Reno, NV	8/1		
Savannah, GA	8/1		
Schenectady, NY	0/2		
St. Joe, MO	8/3		
Yeager, WV	8/2		

Source: U.S. Air Force A8 data, current as of January 24, 2014.

Notes: The 10 LC-130Hs at Schenectady are not counted as combat delivery aircraft, six are owned by DOD, four are owned by the National Science Foundation. The two aircraft listed as BAI are combat delivery aircraft, which is why the PAA is listed as zero and the BAI as two.

As part of the FY2015 Budget Request, the following modifications are being requested by the USAF.

Figure 19. USAF Requested FY2015 Force Structure Changes



Source: USAF.

Notes: This figure does not include Special Mission aircraft or BAI aircraft. The USAF requested that 27 C-130 BAI aircraft, as described above, be divested in FY2015. The graphic did not depict 10 C-130J (AFR) aircraft moving from Kessler AFB to Little Rock but in speaking with Air Force officials that is also included in the current proposal and is depicted in the +10 C-130J aircraft at Little Rock.

Due in part to limits set by Congress on adjusting Reserve Component force structure, the USAF Active Component has plans to retire or recapitalize the entire active duty C-130H combat delivery fleet with C-130J aircraft. If approved, this will create two distinct combat delivery fleets within the Air Force: a C-130J active duty fleet and a C-130H Air National Guard and Reserve fleet. This raises questions on how aircrew training, maintenance, and operations will be conducted in the future. There may also be an impact on Reserve Component recruitment of qualified aircrew as active duty crews will only be qualified on C-130J aircraft.

The challenge for Congress in regards to the combat delivery fleet is setting the desired force structure to maintain desired capabilities but also to do this in the context of a shrinking DOD budget. Approving the USAF FY2015 force structure proposals may reduce the fleet size to more closely match USAF stated requirements but may also have impacts on Reserve Component units.

Conclusion

As Congress moves forward, the most significant debate may be centered on the C-130 combat delivery fleet. With a significant portion of this fleet in the Reserve Component there are considerable interests at state with adjusting force structure. As budgets contract, adjustments will likely need to be made but the substance of these adjustments may incite considerable debate. Maintaining the appropriate operational mix in this environment is a challenge. In regards to recapitalization and modernization, the fleet is aging and actions may need to be taken to maintain a fleet that will support future desired capabilities. With the recently approved multi-year procurement, the framework for future recapitalization is in place, however, at current production levels the fleet may still need significant funding for modernization efforts to remain relevant in future environments. Modernization is an expensive process that should be approached with an informed opinion but also viewed in the context of future force structure requirements and the time it takes to achieve desired capabilities in the current procurement process.

Appendix A. Legislative Activity

FY2014 National Defense Authorization Act (P.L. 113-66)

Title 1 - Procurement

Subtitle D - Air Force Programs

SEC. 132. MULTI-YEAR PROCUREMENT AUTHORITY FOR C–130J AIRCRAFT.

(a) AUTHORITY FOR MULTI-YEAR PROCUREMENT.-Subject to section 2306b of title 10, United States Code, The Secretary of the Air Force may enter into one or more Multi-year contracts, beginning with the fiscal year 2014 program year, for the procurement of C-130J aircraft for the Department of the Air Force and the Department of the Navy.

(b) CONDITION FOR OUT-YEAR CONTRACT PAYMENTS.-A contract entered into under subsection (a) shall provide that any obligation of the United States to make a payment under the contract for a fiscal year after fiscal year 2014 is subject to the availability of appropriations for that purpose for such later fiscal year.

SEC. 133. PROHIBITION ON CANCELLATION OR MODIFICATION OF AVIONICS MODERNIZATION PROGRAM FOR C-130 AIRCRAFT.

(a) PROHIBITION.-None of the funds authorized to be appropriated by this Act or otherwise made available for fiscal year 2014 for the Air Force may be used to- (1) take any action to cancel or modify the avionics modernization program of record for C-130 aircraft; or (2) initiate an alternative communication, navigation, surveillance, and air traffic management program for C-130 aircraft that is designed or intended to replace the avionics modernization program described in paragraph (1).

(b) COMPTROLLER GENERAL REPORT.-Not later than April 1, 2014, the Comptroller General of the United States shall submit to the congressional defense committees a sufficiency review of the cost-benefit analysis conducted under Section 143(b) of the National Defense Authorization Act for Fiscal Year 2013 (Public Law 112–239; 126 Stat. 1662), including any findings and recommendations relating to such review.

Title X - General Provisions

Subtitle I - Other Matters

SEC. 1098. TRANSFER OF AIRCRAFT TO OTHER DEPARTMENTS FOR WILDFIRE SUPPRESSION AND OTHER PURPOSES; TACTICAL AIRLIFT FLEET OF THE AIR FORCE.

(h) TACTICAL AIRLIFT FLEET OF THE AIR FORCE.-

(1) CONSIDERATION OF UPGRADES OF CERTAIN AIRCRAFT IN RECAPITALIZATION OF FLEET.-The Secretary of the Air Force shall consider, as part of the recapitalization of the tactical airlift fleet of the Air Force, upgrades to C-130H aircraft designed to help such aircraft

meet the fuel efficiency goals of the Department of the Air Force and retention of such aircraft, as so upgraded, in the tactical airlift fleet.

(2) MANNER OF UPGRADES.-The Secretary shall ensure that upgrades to the C-130H aircraft fleet are made in a manner that is proportional to the number of C-130H aircraft in the force structure of the regular Air Force, the Air Force Reserve, and the Air National Guard.

FY2013 National Defense Authorization Act (P.L. 112-81)

Title 1 - Procurement

Subtitle D - Air Force Programs

SEC. 141. REDUCTION IN NUMBER OF AIRCRAFT REQUIRED TO BE MAINTAINED IN STRATEGIC AIRLIFT AIRCRAFT INVENTORY.

(a) REDUCTION IN INVENTORY REQUIREMENT.-Section 8062(g)(1) of title 10, United States Code, is amended by adding at the end the following new sentence: ‘‘Effective on the date that is 45 days after the date on which the report under section 141(c)(3) of the National Defense Authorization Act for Fiscal Year 2013 is submitted to the congressional defense committees, the Secretary shall maintain a total aircraft inventory of strategic airlift aircraft of not less than 275 aircraft.’’.

(b) MODIFICATION OF CERTIFICATION REQUIREMENT.-Section 137(d)(3)(B) of the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111–84; 123 Stat. 2221) is amended by striking ‘‘316 strategic airlift aircraft’’ and inserting ‘‘275 strategic airlift aircraft’’.

(c) MOBILITY REQUIREMENTS AND CAPABILITIES STUDY 2018.-

(1) IN GENERAL.-The Director of Cost Assessment and Program Evaluation and the Chairman of the Joint Chiefs of Staff, in coordination with the Commander of the United H. R. 4310-29 States Transportation Command and the Secretaries of the military departments, shall jointly conduct a study that assesses the end-to-end, full-spectrum mobility requirements for all aspects of the National Military Strategy derived from the National Defense Strategy that is a result of the 2012 Defense Strategic Guidance published by the President in February 2012 and other planning documents of the Department of Defense.

(2) MATTERS INCLUDED.-The study under paragraph (1) shall include the following:

(A) A definition of what combinations of air mobility, sealift, surface movements, prepositioning, forward stationing, seabasing, engineering, and infrastructure requirements and capabilities provide low, moderate, significant and high levels of operational risk to meet the National Military Strategy.

(B) A description and analysis of the assumptions made by the Commander of the United States Transportation Command with respect to aircraft usage rates, aircraft mission availability rates, aircraft mission capability rates, aircrew ratios, aircrew production, and aircrew readiness rates.

(C) An analysis of different combinations of air mobility, sealift, surface movements, prepositioning, forward stationing, seabasing, engineering, and infrastructure requirements and capabilities required to support theater and tactical deployment and distribution, including-

(i) the identification, quantification, and description of the associated operational risk (as defined by the Military Risk Matrix in the Chairman of the Joint Chiefs of Staff Instruction 3401.01E) for each excursion as it relates to the combatant commander achieving strategic and operational objectives; and

(ii) any assumptions made with respect to the availability of commercial airlift and sealift capabilities and resources when applicable.

(D) A consideration of metrics developed during the most recent operational availability assessment and joint forcible entry operations assessment.

(E) An assessment of requirements and capabilities for major combat operations, lesser contingency operations as specified in the Baseline Security Posture of the Department of Defense, homeland defense, defense support to civilian authorities, other strategic missions related to national missions, global strike, the strategic nuclear mission, and direct support and time-sensitive airlift missions of the military departments.

(F) An examination, including a discussion of the sensitivity of any related conclusions and assumptions, of the variations regarding alternative modes (land, air, and sea) and sources (military, civilian, and foreign) of strategic and theater lift, and variations in forward basing, seabasing, prepositioning (afloat and ashore), air-refueling capability, advanced logistics concepts, and destination theater austerity, based on the new global footprint and global presence initiatives.

(G) An identification of mobility capability gaps, shortfalls, overlaps, or excesses, including-

(i) an assessment of associated risks with respect to the ability to conduct operations; and

(ii) recommended mitigation strategies where possible.

(H) An identification of mobility capability alternatives that mitigate the potential impacts on the logistic system, including-

(i) a consideration of traditional, non-traditional, irregular, catastrophic, and disruptive challenges; and

(ii) a description of how derived mobility requirements and capabilities support the accepted balance of risk in addressing all five categories of such challenges.

(I) The articulation of all key assumptions made in conducting the study with respect to-

(i) risk;

(ii) programmed forces and infrastructure;

(iii) readiness, manning, and spares;

(iv) scenario guidance from defense planning scenarios and multi-service force deployments;

(v) concurrency of major operations;

(vi) integrated global presence and basing strategy;

(vii) host nation or third-country support;

(viii) use of weapons of mass destruction by an enemy; and

(ix) aircraft being used for training or undergoing depot maintenance or modernization.

(J) A description of the logistics concept of operations and assumptions, including any support concepts, methods, combat support forces, and combat service support forces that are required to enable the projection and enduring support to forces both deployed and in combat for each analytic scenario.

(K) An assessment, and incorporation as necessary, of the findings, conclusions, capability gaps, and shortfalls derived from the study under section 112(d) of the National Defense Authorization Act for Fiscal Year 2012 (P.L. 112-81; 125 Stat. 1318).

(3) SUBMISSION.—The Director of Cost Assessment and Program Evaluation and the Chairman of the Joint Chiefs of Staff shall jointly submit to the congressional defense committees a report containing the study under paragraph (1).

(4) FORM.-The report required by paragraph (3) shall be submitted in unclassified form, but may include a classified annex.

SEC. 143. AVIONICS SYSTEMS FOR C-130 AIRCRAFT.

(a) LIMITATIONS.-

(1) AVIONICS MODERNIZATION PROGRAM.-The Secretary of the Air Force may not take any action to cancel or modify the avionics modernization program for C–130 aircraft until a period of 90 days has elapsed after the date on which the Secretary submits to the congressional defense committees the cost-benefit analysis conducted under subsection (b)(1).

(2) CNS/ATM PROGRAM.-

(A) IN GENERAL.-The Secretary may not take any action described in subparagraph (B) until a period of 90 days has elapsed after the date on which the Secretary submits to the congressional defense committees the cost-benefit analysis conducted under subsection (b)(1).

(B) COVERED ACTIONS.-An action described in this subparagraph is an action to begin an alternative communication, navigation, surveillance, and air traffic management program for C-130 aircraft that is designed or intended-

(i) to meet international communication, navigation, surveillance, and air traffic management standards for the fleet of C-130 aircraft; or

(ii) to replace the current avionics modernization program for the C-130 aircraft.

(b) COST-BENEFIT ANALYSIS.-

(1) FFRDC-The Secretary shall seek to enter into an agreement with the Institute for Defense Analyses to conduct an independent cost-benefit analysis that compares the following alternatives:

(A) Upgrading and modernizing the legacy C-130 airlift fleet using the C-130 avionics modernization program.

(B) Upgrading and modernizing the legacy C-130 airlift fleet using a reduced scope program for avionics and mission planning systems.

(2) MATTERS INCLUDED.-The cost-benefit analysis conducted under paragraph (1) shall take into account-

(A) the effect of life-cycle costs for-(i) adopting each of the alternatives described in subparagraphs (A) and (B) of paragraph (1); and (ii) supporting C-130 aircraft that are not upgraded or modernized; and

(B) the costs associated with the potential upgrades to avionics and mission systems that may be required for legacy C-130 aircraft to remain relevant and mission effective in the future.

Title X – General Provisions

Subtitle F - Miscellaneous Authorities and Limitations

SEC. 1059. LIMITATIONS ON RETIREMENT OF FIXED-WING INTRA-THEATER AIRLIFT AIRCRAFT FOR GENERAL SUPPORT AND TIME SENSITIVE/MISSION CRITICAL DIRECT SUPPORT

AIRLIFT MISSIONS OF THE DEPARTMENT OF DEFENSE.

(a) LIMITATION ON RETIREMENTS.-During fiscal year 2013, the Secretary of the Air Force shall retain an additional 32 fixed wing, intra-theater airlift aircraft beyond the number of such aircraft proposed to be retained in the Secretary's total force structure proposal provided to the congressional defense committees on November 2, 2012.[73]

[73] The number proposed in the total force structure proposal was 326. The additional 32 directed the intra-theater aircraft "floor" at 358.

Appendix B. Key Events

March 2014[74]

- USAF submitted FY2015 Budget Request for 13 C-130Js. [75]USMC requested one KC-130J.[76]

February 2014

- Rolls-Royce Corp. in Indianapolis, IN received a $54.3 million firm-fixed-price, indefinite-delivery/indefinite-quantity contract for depot level repair of 50 KC-130 aircraft engines, propellers and other propulsion system components for the U.S. Marine Corps (47 planes/$50.2M/92%) and the government of Kuwait (3 planes/$4.1M/8%). $24.5 million committed immediately, using FY2014 Navy O&M budgets. Work to be performed in Indianapolis, IN (92%), Al Mubarak, Kuwait (2.1%); various locations in Japan (2%); Cherry Point. NC (1.3%); Miramar, CA (1.3%); and Fort Worth, TX (1.3%), and is expected to be complete in February 2015. This contract was not competitively procured pursuant to FAR 6.302-1 by U.S. Naval Air Systems Command in Patuxent River, MD (N00019-14-D-0007).
- Lockheed Martin Aeronautics Co. in Marietta, GA received a sole-source $12.2 million firm-fixed-price contract modification to provide spare parts that are unique to U.S. SOCOM's HC/MC-130Js, and cannot be drawn from general C-130J fleet spares. All funds were committed immediately, using FY2012 aircraft budgets. Work to be performed at Marietta, GA, and is expected to be complete by Feb 16, 2016. USAF Life Cycle Management Center/WISK at Wright-Patterson AFB, OH manages the contract (FA8625-11-C-6597, PO 0209).
- Lockheed Martin and Rolls-Royce complete a long-term agreement worth up to $1 billion, to deliver approximately 600 AE2100 turboprop engines for American and international contracts from 2014 through 2018. That totals about 150 aircraft, but it is probably closer to 125 with spares added in.

January 2014

- The USAF flew a fully-converted AC-130J gunship for the 1st time, at Eglin AFB, FL.
- A $105.3 million indefinite-delivery/indefinite quantity contract modification, exercising the 3rd option under the USAF's C-130J Long Term Sustainment Program. It is a two-year ordering period for sustainment services including logistical support, program management support, engineering services, spares, and technical data. Funds to be committed as needed through task orders. Work

[74] Data for this timeline drawn from Defense Industry Daily website at https://www.defenseindustrydaily.com/cat/military-overall/forces-marines/feed/; downloaded March 3, 2014.

[75] U.S. Air Force, *FY15 Budget Overview,* March 2014, p. 14, http://www.saffm.hq.af.mil/shared/media/document/AFD-140304-040.pdf.

[76] Department of the Navy, *FY15 President's Budget,* March 4, 2014, p. 10, http://web.archive.org/web/20140305002625/http://www.finance.hq.navy.mil/FMB/15pres/DON_PB15_Press_Brief.pdf.

to be performed at Marietta, GA, and is expected to be complete by Jan 31, 2016. USAF Life Cycle Management Center/WLKCA at Robins AFB, GA manages the contract (FA8504-06-D-0001, PO 0026).

- USAF FY2013 Operational Test and Evaluation Annual report released reviewing AC-130J, HC/MC-130J. Report identified survivability and interoperability issues to be addressed.[77]
- Rolls Royce in Indianapolis, IN received a $182.7 million firm-fixed-price, requirements contract modification, exercising the 7th annual option for AE2100-D3 engine logistics support, program management support, engineering services, spares, and technical data. Funds to be spent as needed. Work to be performed at Indianapolis, IN, and is expected to be complete by Jan 31, 2015. The USAF Life Cycle Management Center/WLKCA at Robins AFB, GA, manages this contract (FA8504-07-D-0001, PO 0023).

December 2013

- Lockheed Martin in Marietta, GA received an $11,060,628 firm-fixed-price, indefinite-delivery/indefinite-quantity contract for logistics and engineering services in support of the C/KC-130J Aircraft for the U.S. Marine Corps/Marine Corps Reserve, U.S. Coast Guard and the Kuwait Air Force. Work to be performed in Marietta, GA (65.3%); Afghanistan (12%); Palmdale, CA (9.2%); Kuwait (3.3%); Okinawa, Japan (3%); Miramar, CA (1.8%); Cherry Point, NC (1.7%); Elizabeth City, NC (1.6%); Fort Worth, (1.5%); and Greenville, SC (.6%); and is expected to be completed in December 2014. No funds were obligated at time of award. Funds to be obligated against individual delivery orders as they are issued. This contract combined purchases for the U.S. Marine Corps/Marine Corps Reserve ($8,886,223; 80.3%); U.S. Coast Guard ($1,423,148; 12.9%); and the Government of Kuwait ($751,257; 6.8%) under the Foreign Military Sales Program. This contract was not competitively procured pursuant to 10 U.SC 2304(c)(1). The Naval Air Systems Command, Patuxent River, MD manages the contract (N00019-14-D-0006).
- A sole-source, maximum $169.7 million firm-fixed-price advance procurement contract for funding related to 18 C-130Js. All funds were committed immediately, using FY2013 procurement budgets. Work to be performed at Marietta, GA, and is expected to be complete by Oct 31, 2016. The USAF Life Cycle Management Center/WLNNC at Wright-Patterson AFB, OH manages this contract (FA8625-14-C-6450).
- A $48.5 million advance procurement contract modification for funding related to 5 more C-130Js. All funds were committed immediately, using FY2012 procurement budgets. All funds are committed immediately, using FY2012 aircraft budgets. Work under this multi-year contract to be performed at Lockheed Martin in Marietta, GA until Dec 31, 2016. The USAF Life Cycle Management Center/WLNNC at Wright-Patterson AFB, OH manages the contract (FA8625-11-C-6597, PO 0230).

[77] USAF, Director, Operational Test and Evaluation, *FY13 Annual Report,* January 2014, http://www.dote.osd.mil/pub/reports/FY2013/pdf/other/2013DOTEAnnualReport.pdf.

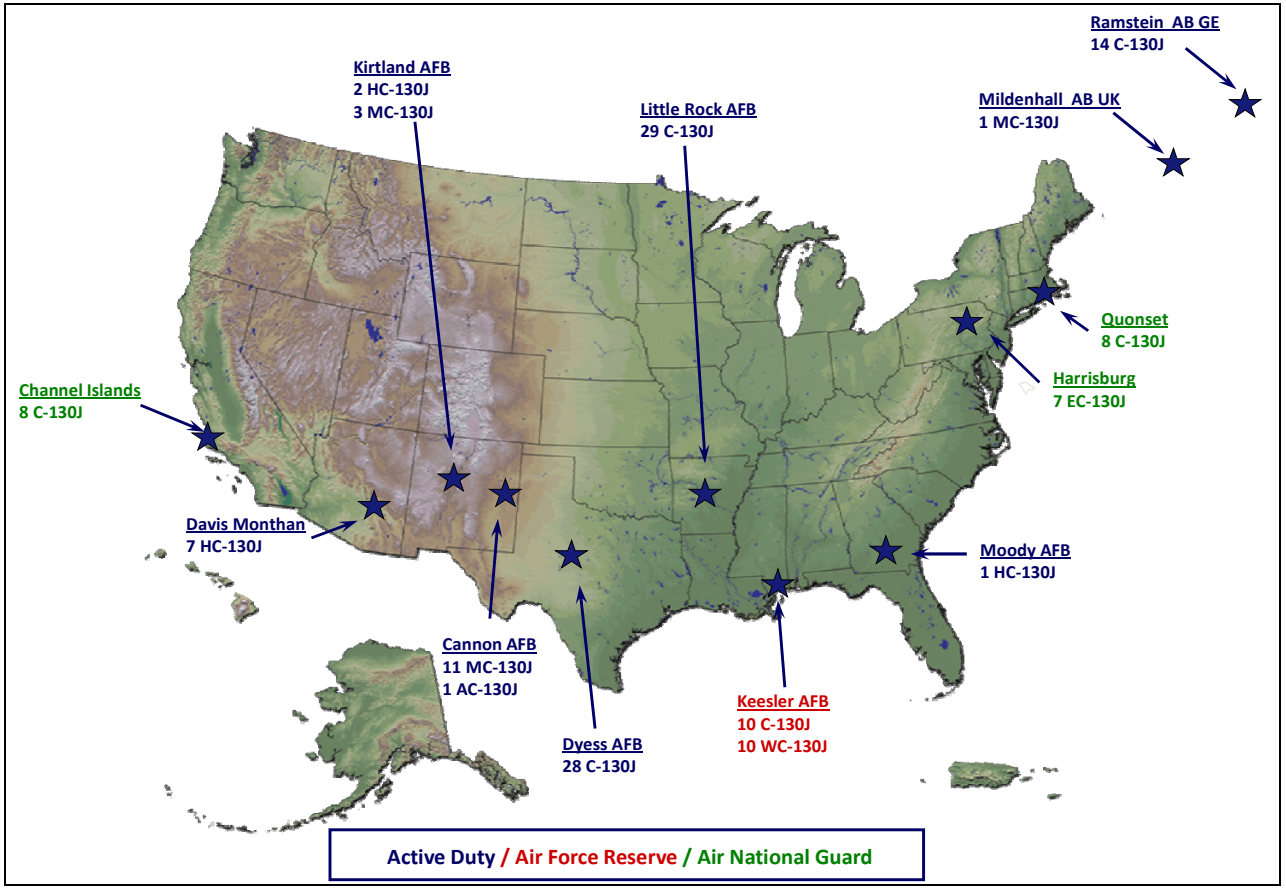
- Lockheed Martin in Marietta, GA received a not-to-exceed $81.2 million modification to an existing contract to fund Israeli C-130J-30 aircraft #4, advance long-lead procurement of C-130Js #5 and 6, and external fuel tank modification kits. Work to be performed at Marietta, GA, and is expected to be completed by June 30, 2016. This contract is 100% foreign military sales for Israel, with the USAF Life Cycle Management Center/WLNNC at Wright-Patterson AFB, OH acting as Israel's agent (FA8625-11-C-6597, PO 0231).

October 2013

- Lockheed Martin Corp., Marietta, Ga., was awarded a $21.6 million contract modification to redesign the C-130J's Color Multipurpose Display Unit and Multi-Function Color Display for C-130J aircraft. The CDU & MFCDs need new central processor and graphics processor chip sets, in order to cope with "diminishing manufacturing sources." Work to be performed at Marietta, GA and is expected to be complete by September 30, 2015. This contract actually includes 15% foreign military sales to C-130 customers Norway, Israel and Kuwait, on top of the $21.6 million in FY2012 in USAF procurement funds that were committed immediately. USAF Force Life Cycle Management Center/WLNNC at Wright-Patterson AFB, OH manages the contract (FA8625-11-C-6597, PO 0228).

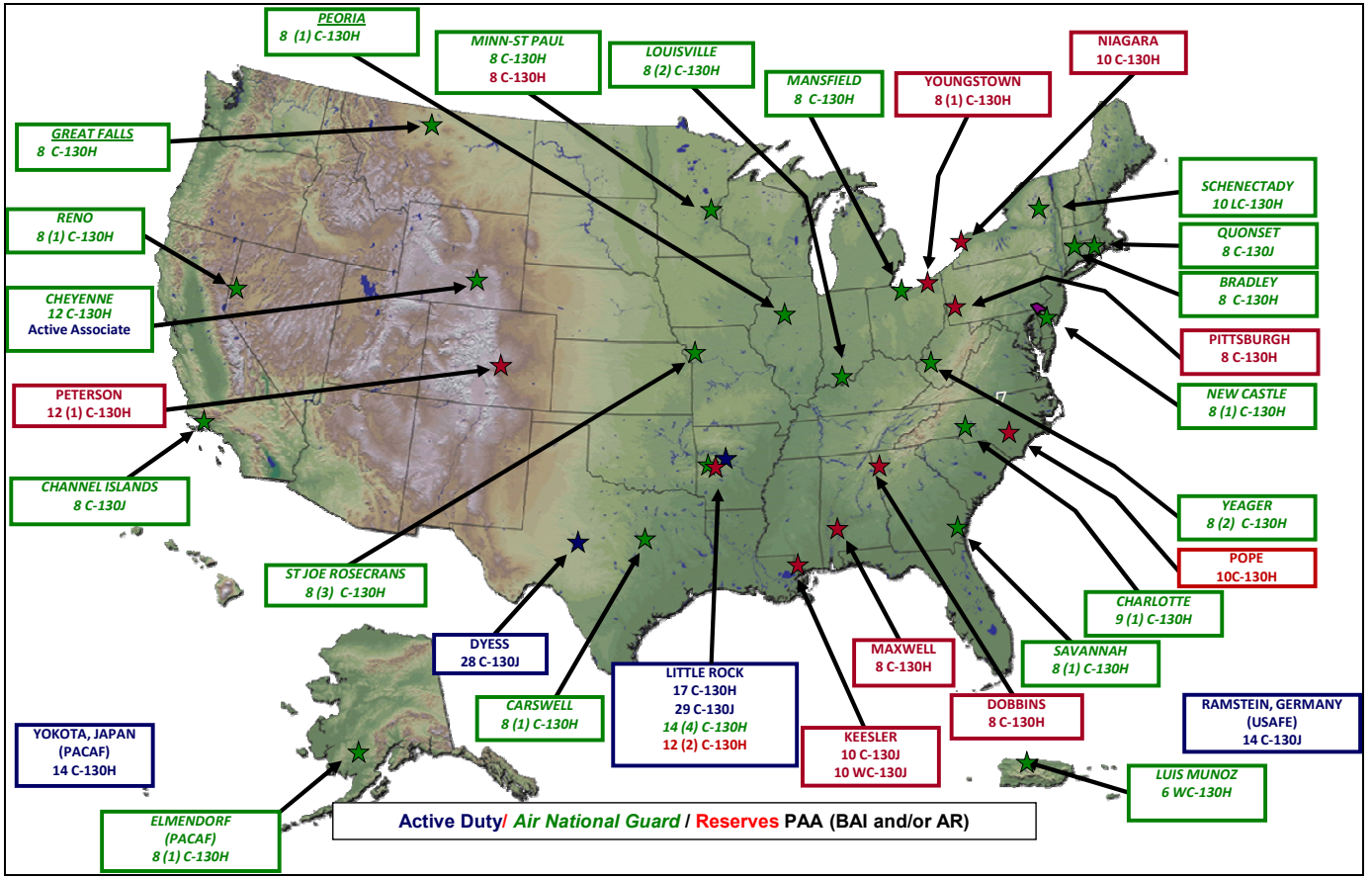
Appendix C. C-130 Force Basing

Figure C-1. USAF C-130J Basing



Source: USAF C-130J Basing PowerPoint, FY2014 Staffer Brief, July 2013.

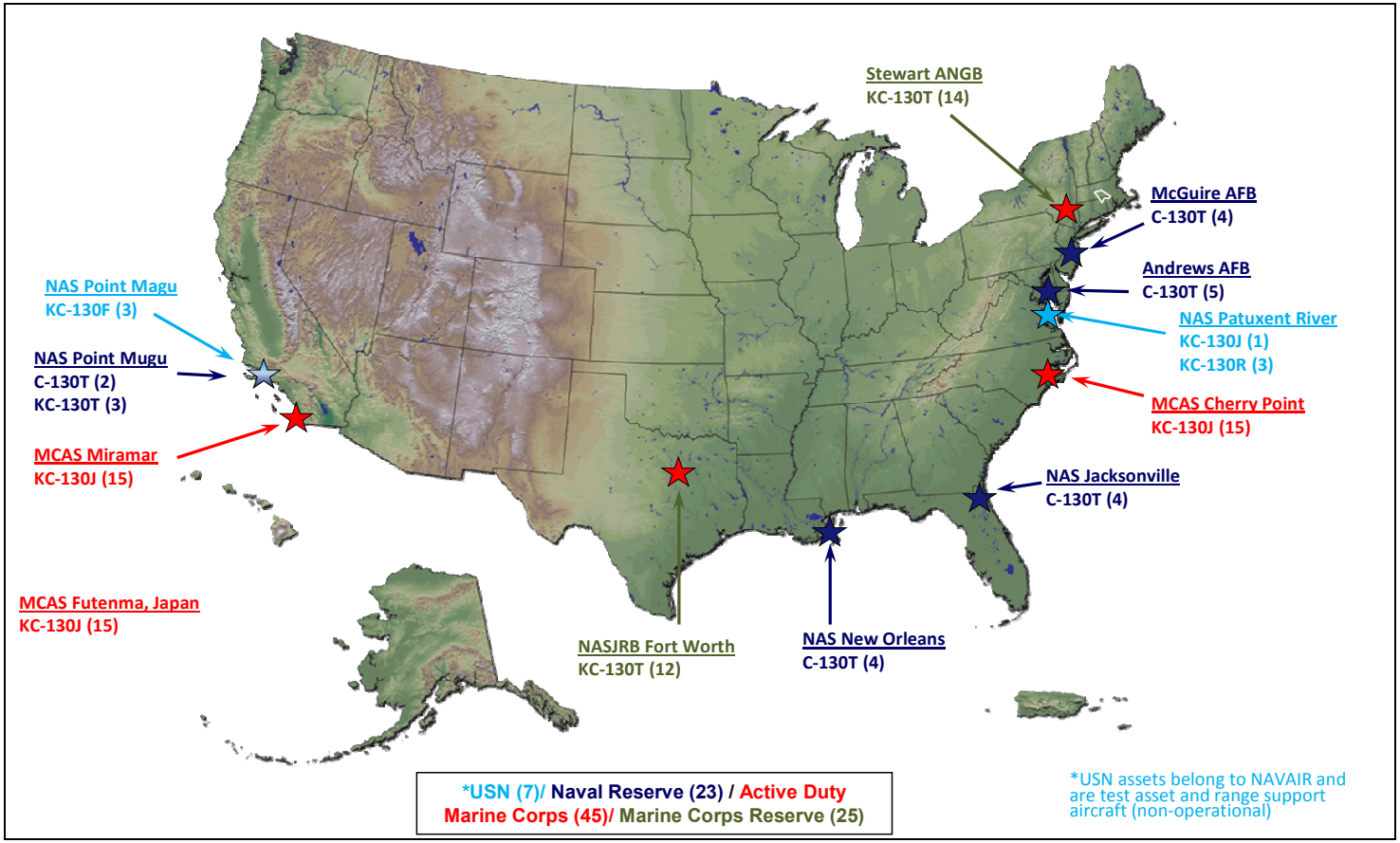
Figure C-2. USAF C-130 Basing



Source: USAF C-130J Basing PowerPoint, FY2014 Staffer Brief, July 2013.

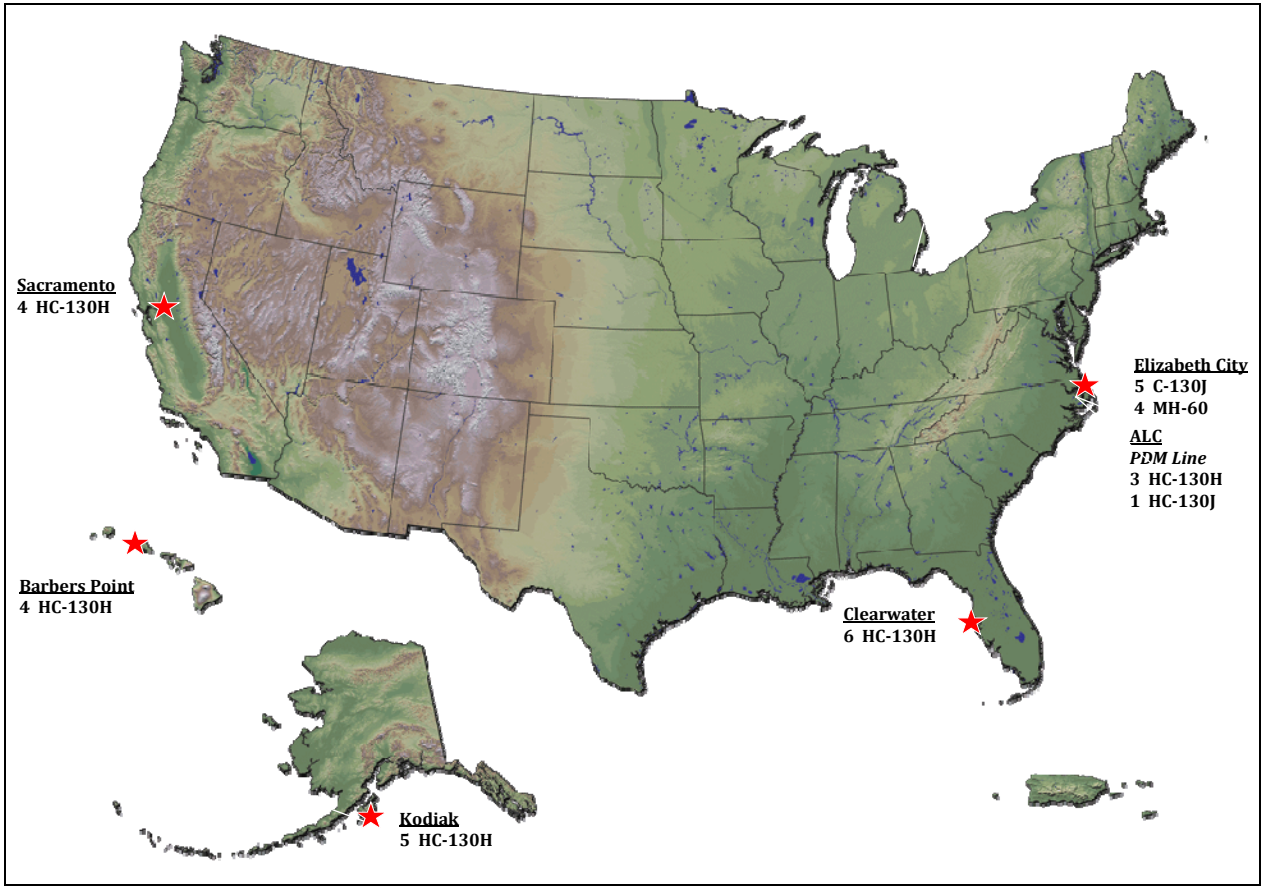
Notes: Does not include Special Missions aircraft.

Figure C-3. U.S. Navy and Marine Corps C-130 Basing



Source: Email from USN PMA207, KC-130J Deputy Program Manager.

Figure C-4. U.S Coast Guard C-130 Basing



Source: USCG, Office of Aviation Forces website, http://www.uscg.mil/hq/cg7/cg711/c130h.asp.

Appendix D. Comparing C-130 Cockpits

The following pictures are provided for context when discussing cockpit modifications on the C-130 aircraft. **Figure D-1** is an unmodified C-130H. **Figure D-2** is a C-130H with the AMP modification. **Figure D-3** is a production C-130J cockpit. These pictures may also provide some clarity on why aircrew members are only allowed to be qualified on one version of the aircraft. While the outside of the aircraft looks very similar the inside is quite different between models. The crew makeups are different as well. On the older H models there are a minimum of 5 crewmembers (2 Pilots, 1 Navigator, 1 Engineer, 1 Loadmaster). The AMP modification takes away the Navigator position and the new J models take away the Engineer and Navigator position for a minimum crew of three.

Figure D-1. Older Model C-130H Cockpit

Source: USAF 311HSW/PA Release, downloaded from: http://www.wpafb.af.mil/shared/media/document/AFD-090121-027.pdf, March 2, 2014.

Figure D-2. C-130H Post-AMP Modification

Source: USAF 311HSW/PA Release, downloaded from: http://www.wpafb.af.mil/shared/media/document/AFD-090121-027.pdf, March 2, 2014.

Figure D-3. C-130J Cockpit

Source: Airforce-technology.com; downloaded from: http://www.airforce-technology.com/projects/hercules/hercules6.html, March 2, 2014.

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