

# Fact Sheet on the U.S. Air Force C-130J Transport

In the opinion of analysts at the Center for Defense Information from the Straus Military Reform Project, the Air Force's new C-130J is cost **ineffective**. Using data available from the Air Force, budget data, and the Pentagon's Director of Operational Test and Evaluation and the Inspector General, we arrive at this conclusion based on the analysis below.

Research Associate Ana Marte and Research Assistant Valerie Reed from CDI's Straus Military Reform Project, with some assistance from Director Winslow Wheeler; provide a brief overview of the C-130J Transport program and a list of sources for general information, government reports and analysis.

## C-130J Transport

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Beginning production in 1954, the C-130 "Hercules" has the longest continuous production of any U.S. military aircraft in history. Built with the capacity to accommodate moderately oversized cargo, the Air Force characterizes the C-130 as able to carry up to 42,000 pounds and to take off and land on short and unprepared runways.<sup>1</sup> The C-130 was originally designed to transport cargo, troops and medical evacuees. However, the C-130 now also performs airborne assault, search and rescue, weather reconnaissance, aerial refueling, aerial firefighting, and humanitarian and natural disaster relief.



**Lockheed Martin's C-130J Super Hercules**

Over its long history, several models of the C-130 aircraft have been produced:

- The **C-130A** formally entered Air Force service in 1956; 219 "A" models were produced.
- The **C-130B**, with upgraded engines and a 4-bladed propeller, was first ordered in 1959; 134 were produced.
- In 1962, the Air Force developed the **C-130E**, equipped with larger external fuel tanks, increased maximum takeoff weight capability, increased range, upgraded avionics, and a number of structural changes; 389 aircraft were ordered.
- The **C-130H started** in 1974 with a more powerful engine and other alterations; 308 aircraft were ordered.
- The vast majority of these aircraft were delivered to the Air Force; however, different C-130 configurations have also been acquired by the U.S. Marine Corps and Coast Guard. According to a Lockheed Martin spokesperson, the Coast Guard has received 6 C-130Js, and the Marines have ordered 36 J models, of which 28 have been delivered.<sup>2</sup>
- There have also been foreign sales; altogether about 2,300 C-130s of various configurations have been built for use in over 67 foreign countries.<sup>3</sup>

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<sup>1</sup> "C-130 Hercules," *Air Force Link*, May 2006, [www.af.mil/factsheets/factsheet.asp?fsID=92](http://www.af.mil/factsheets/factsheet.asp?fsID=92).

<sup>2</sup> A telephone inquiry was made with Lockheed Martin on December 17, 2007 by Research Associate Ana Marte, where a spokesperson confirmed that the U.S. Marine Corps had ordered 36 C-130J units and had 28 delivered. A second telephone conversation revealed that the U.S. Coast Guard had ordered 6 C-130J units, all of which had already been delivered.

<sup>3</sup> "C-130J Hercules Tactical Transport Aircraft, USA," *AirForce-Technology.com*, 2007, <http://www.airforce-technology.com/projects/hercules/>.

## Background:

Production of the new C-130J started in 1997 and two years later, in February 1999, it entered the Air Force inventory. The plane was first deployed into combat in Iraq in December 2004;<sup>4</sup> however, it was not certified for Initial Operational Capacity (IOC) until October 2006.<sup>5</sup>

There are two models of the C-130J - with and without 15-foot fuselage plugs added to enable carrying larger loads. Other changes to both J models include new 6-bladed composite propellers, new Rolls Royce of turboprop engines (with their horsepower modestly increased above the “H” model from 4, 591 horsepower to 4,700 horsepower) and new avionics. All C-130J models promise improvements in range, speed, climb time, cruise altitude, and the potential of less maintenance requirements.<sup>6</sup> As discussed below in this fact sheet, the cost for the J model has increased significantly more than the performance over the earlier “E” and “H” models, especially in the key measures of range and payload. The assurance of cheaper and easier maintenance for the J model, as compared to older models, is yet to be documented in objective analytical materials reviewed by CDI for the purpose of this fact sheet.

Lockheed began developing the C-130J in the early 1990s, using more than \$1 billion of its own funds and expecting to find commercial customers for the aircraft. The private sector market did not materialize as Lockheed had expected.<sup>7</sup> To date, Lockheed Martin has yet to sell a J model to a non-government customer.<sup>8</sup>

The Air Force first awarded Lockheed Martin a five-year contract for the C-130J in November 1996. The contract was controversial because it was written as a commercial DOD purchase, and no military aircraft had ever been declared a commercial item (*i.e., an item the public can purchase*). The Air Force said it wanted the commercial contract because it would speed up the acquisition process. However, the process was actually delayed because Lockheed Martin had to first comply with Federal Aviation Administration (FAA) requirements.<sup>9</sup>

The C-130J aircraft was designed to replace the C-130E and some C-130H models; some of the former date back to the 1960s with an age up to 42 years. Problems described by the Air Force for some of these aircraft include vanishing vendors, obsolete parts and costly structure repairs. Many of the older C-130s have surpassed their “equivalent baseline hour” (EBH) milestones, which equates to the estimated airframe life of the aircraft. The Air Force postulates that 30,000 EBH makes an aircraft “combat ineffective” and 45,000 EMH signifies an aircraft is “unworthy of safe flight.”<sup>10</sup> Although, many old C-130Es are being modernized, consensus within the Department of Defense has not been reached on when it is best to refurbish or to invest in the purchase of new aircraft.

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<sup>4</sup> “C-130J Hercules,” *GlobalSecurity.org*, 2007, <http://www.globalsecurity.org/military/systems/aircraft/c-130j.htm>.

<sup>5</sup> “C-130J Super Hercules,” *Defense Update*, 2006, <http://www.defense-update.com/products/c/C-130J.htm>.

<sup>6</sup> “C-130 Hercules,” *Air Force Link*, May 2006, [www.af.mil/factsheets/factsheet.asp?fsID=92](http://www.af.mil/factsheets/factsheet.asp?fsID=92).

<sup>7</sup> “C-130J Hercules,” *GlobalSecurity.org*, 2007, <http://www.globalsecurity.org/military/systems/aircraft/c-130j.htm>.

<sup>8</sup> “Taxpayers Carry the Load: The C-130J Cargo Plane Does Not,” Project on Government Oversight, March 15, 2005, <http://www.pogo.org/p/defense/do-050301-C130J.html>.

<sup>9</sup> “Taxpayers Carry the Load: The C-130J Cargo Plane Does Not,” Project on Government Oversight, March 15, 2005, <http://www.pogo.org/p/defense/do-050301-C130J.html>.

<sup>10</sup> Statement of Donald J. Hoffman Military Deputy Office of the Assistant Secretary of the Air Force for Acquisition Department of the Air Force, Committee on Senate Armed Services Subcommittee on Airland, *CQ Congressional Testimony*, April 26, 2007.

## Complications:

The Air Force received its first of several J models from 1999-2003, none of which were declared ready for combat.<sup>11</sup> A FY 2001 report by the DOD Director of Operational Test and Evaluation determined that the aircraft was “not operationally supportable” and “not operationally effective for the airland mission” because of numerous deficiencies.<sup>12</sup> Nevertheless, 10 additional J models were requested in the President George W. Bush’s subsequent 2003 budget for \$3.9 billion.<sup>13</sup> Later, a July 2004 report by the DOD Inspector General stated none of the J models delivered met contract or operational requirements and that the Air Force lacked justification for its commercial purchasing strategy. Yet, as the DOD Inspector General report highlighted, the Air Force paid Lockheed Martin more than 99 percent of the C-130Js contracted price, the non-delivery of contract-compliant aircraft notwithstanding.<sup>14</sup>

In 2005, the deputy secretary of defense proposed killing the C-130J program. However, the combination of intense congressional lobbying and the release of an Air Force report asserting that program cancellation for the C-130J would cost \$1.78 billion in termination fees helped to cause the program to be reinstated. Additional data later revealed that the Air Force’s overestimated the cancellation fees by \$1.1 billion.<sup>15</sup> However, no significant action was taken by either the Defense Department or Congress against the Air Force’s misstatement; instead the program was converted to a traditional procurement contract, and purchases continued.

Although, a new termination date for C-130J production was recently scheduled for 2009, international orders and projected U.S. acquisitions ensure that production will continue thereafter. As a matter of fact, a November 2007 directive from Deputy Defense Secretary Gordon England indicates that DOD plans acquire 32 additional C-130Js for a total cost of \$2.7 billion between 2009 and 2013.<sup>16</sup>

Analysts at the Center for Defense Information find it remarkable that an airframe design as old as 50 years could emerge with as many serious problems as the C-130J. Nevertheless, the aircraft remains extremely popular among the Air Force, Congress and many think tanks. Our skepticism results from the high costs of C-130J models that accompany their unimpressive increased performance, especially on two key performance criteria (range and payload), compared to the amount of increased cost.

According to a May 2006 Air Force fact sheet on the C-130, the “unit cost” for the J model is \$48.5 million (in 1998 dollars). The same fact sheet cites a lower “unit cost” for the earlier “H” model at \$30.1 million and \$11.9 for the “E” model.<sup>17</sup> However, these numbers do not tell the whole story; they appear to be what the Air Force calls “flyaway” costs – costs that only address aircraft production expenses, not the costs of development or testing. Using the Defense Department’s authoritative Selected Acquisition Reports (SARs) and comparing a more inclusive “total program unit cost” for both the “J” and “H” model in current year dollars, discloses a cost relationship between the “J” and “H” models where the C-130J costs about twice as much as the “H” model.

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<sup>11</sup> “Taxpayers Carry the Load: The C-130J Cargo Plane Does Not,” Project on Government Oversight, March 15, 2005, <http://www.pogo.org/p/defense/do-050301-C130J.html>.

<sup>12</sup> “C-130J Airlift Aircraft,” Department of Defense, Director, Operational Test and Evaluation, Annual Report, FY 2001, February 2002, p. V-24, 25.

<sup>13</sup> P-1 Book, [http://www.defenselink.mil/comptroller/defbudget/fy2003/fy2003\\_p1.pdf](http://www.defenselink.mil/comptroller/defbudget/fy2003/fy2003_p1.pdf).

<sup>14</sup> “Contracting for and Performance of the C-130J Aircraft,” Office of the Inspector General of the Department of Defense, July 23, 2004, <http://www.dodig.osd.mil/Audit/reports/fy04/04-102.pdf>, p. I.

<sup>15</sup> Renae Merle, “‘Incomplete’ Report Used to Save Lockheed Project, Pentagon Says,” *Washington Post*, June 24, 2006.

<sup>16</sup> Tony Capaccio, “Lockheed Martin C-130J Purchases Planned By Pentagon Rise 90 Percent,” *Washington Examiner*, December 11, 2007.

<sup>17</sup> “C-130 Hercules,” *Air Force Link*, May 2006, [www.af.mil/factsheets/factsheet.asp?fsID=92](http://www.af.mil/factsheets/factsheet.asp?fsID=92).

The two charts below illustrate both the cost of development and production for the C-130J and “H” models. (These data can be found in the Summary Tables of the Defense Department’s *Selected Acquisition Reports*, at <http://www.acq.osd.mil/ara/am/sar/>.) Note that the most recent unit cost for the “J” model at \$98 million per unit is more than twice the cost of the later “H” models at approximately \$45 million.

<b>C-130J Program Acquisition Cost (\$Millions current year dollars)</b>			
<b>As of Date:</b>	<b>DOD Total Cost Estimate</b>	<b>Quantity</b>	<b>Cost per Unit</b>
September 30, 2007 <sup>18</sup>	8,071.1	82	98.4
December 31, 2006	8,071.1	82	98.4
December 31, 2005	7,612.3	79	96.3
December 31, 2004	6,223.2	53	117.4
December 31, 2003	16,396.5	168	97.5
December 31, 2002	16,501.3	168	98.2
December 31, 2001	15,671.2	168	93.2
September 30, 2000 <sup>19</sup>	2,633.2	32	82.2
December 31, 1999	2,633.2	32	82.2
December 31, 1998	2,859.6	37	77.2
December 31, 1997	1,198.9	18	66.6
December 31, 1996	600.5	8	75.0

<b>C-130H Program Acquisition Cost (\$Millions current year dollars)</b>			
<b>As of Date:</b>	<b>DOD Total Cost Estimate</b>	<b>Quantity</b>	<b>Cost per Unit</b>
December 31, 1994	699.0	16	43.6
December 31, 1993	734.1	16	45.8
December 31, 1992	729.9	16	45.6

In the next chart, we show the unit cost of the “E,” “H,” and “J” models of the C-130 respectively, as accounted by the Air Force in 1998 dollars. These data are “flyaway” costs; they are available at the *Air Force Link C-130 Hercules Fact Sheet* at <http://www.af.mil/factsheets/factsheet.asp?fsID=92>.

<b>C-130 Unit Cost Per Model (in FY 1998 \$Millions of Constant Dollars)</b>	
<b>Model</b>	<b>Unit Cost</b>
C-130E	11.9
C-130H	30.1
C-130J	48.5

A review of budget materials for FY 2008 paints a different picture for these “flyaway” costs of the C-130J, however. For FY 2008, Congress appropriated \$686.1 million for 9 C-130J planes. Advance procurement in 2007 for these same 9 planes was \$113.6 million; totaling \$799.7 million. Our calculations

<sup>18</sup> According to the Selected Acquisition Report Summary Tables, the most recent data is as of September 30, 2007.

<sup>19</sup> No information was listed for December 31, 2007 on the Selected Acquisition Report Summary Tables; therefore September 30, 2007 statistics were included.

yield a contemporary dollar “flyaway” cost per unit of \$88.5 million; a significantly higher cost than the Air Force’s advertised \$48.5 million per unit.

### **Test & Operational Performance:**

C-130J advocates promised many improvements. These included reduced manpower requirements and a life cycle cost savings over earlier models, together with improvements in digital avionics, advanced integration diagnostics, an enhanced cargo handling system, improved defensive systems, and a redesigned flight station with a two-person cockpit.<sup>20</sup> In addition, the new engines were intended to provide improved takeoff, climb and cruise performance. Not all of these promises have been delivered.

In 2004, the Pentagon’s Director of Operational Test and Evaluation (DOT&E), Thomas Christie, now an adviser to the Straus Military Reform Project, wrote in his annual report that “major issues confronting the C-130J program include funding of logistics support and training systems; hardware, software, and technical order deficiencies; manufacturing quality; sub-system reliability; failure to meet required measures of system effectiveness and suitability; and resolution of documented deficiencies.”<sup>21</sup>

In 2003, the C-130J mission capable rate was a modest 62.4 percent.<sup>22</sup> According to the July 2004 report by the DOD Inspector General, the problems with cargo loading, hardware and software, radar performance, and propeller damage inhibited the J model from being capable of performing its mission of transporting and dropping troops and equipment in combat zones.<sup>23</sup>

After the Inspector General’s assessment, the J model was modified to correct its operational limitations. In 2005, the Air Force declared an improved mission capable rate of 93.1 percent. In October 2006, the Air Mobility Command (AMC) assessed the C-130J as having reached initial operational capacity (IOC), which entailed successful completion of Qualification Operational Test and Evaluation (QOT&E) requirements. Such actions resulted in the first combat delivery squadron’s ability to reach its full Primary Aircraft Authorized (PAA) limit with the declared ability to perform operational air-land missions, and the manning of the squadron with trained aircrews and maintenance personnel to support the mission.<sup>24</sup>

However, the new Director of Operational Test and Evaluation’s FY 2006 Annual Report indicated that the C-130J is still not effective for worldwide operations in a non-permissive threat environment. Noting the J model’s shortfalls in user suitability requirements and maintainability issues such as ineffective lasers and radar systems, the director states that operational testing will need to continue after 2010, and he recommends follow-on testing for the ALR-56M radar warning receiver, formation flight capability, and correction of various maintenance deficiencies.<sup>25</sup>

The C-130J has been used in both Iraq and Afghanistan and it has proven survivable against hand-held anti-aircraft rockets. The threat of other anti-air systems persists, however, and many of the deficiencies noted by DOT&E remain.

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<sup>20</sup> “C-130 J Family of Aircraft,” DOD Director of Operational Test and Evaluation (DOT&E) Annual Report, Fiscal Year 2006, <http://www.cdi.org/PDFs/DOTE%20FY06%20report%20AF.pdf>, 183-184.

<sup>21</sup> “C-130J Family of Aircraft,” DOD Director of Operational Test and Evaluation (DOT&E) Annual Report, Fiscal Year 2004, <http://stinet.dtic.mil/cgi-bin/GetTRDoc?AD=ADA430414&Location=U2&doc=GetTRDoc.pdf>, 251-253.

<sup>22</sup> “Taxpayers Carry the Load: The C-130J Cargo Plane Does Not,” Project on Government Oversight, March 15, 2005, <http://www.pogo.org/p/defense/do-050301-C130J.html>.

<sup>23</sup> “Contracting for and Performance of the C-130J Aircraft,” Office of the Inspector General of the Department of Defense, July 23, 2004, <http://www.dodig.osd.mil/Audit/reports/fy04/04-102.pdf>, 8-10.

<sup>24</sup> “AMC Declares C-130J Operational,” Department of Defense U.S. Air Force Release, October 16, 2006.

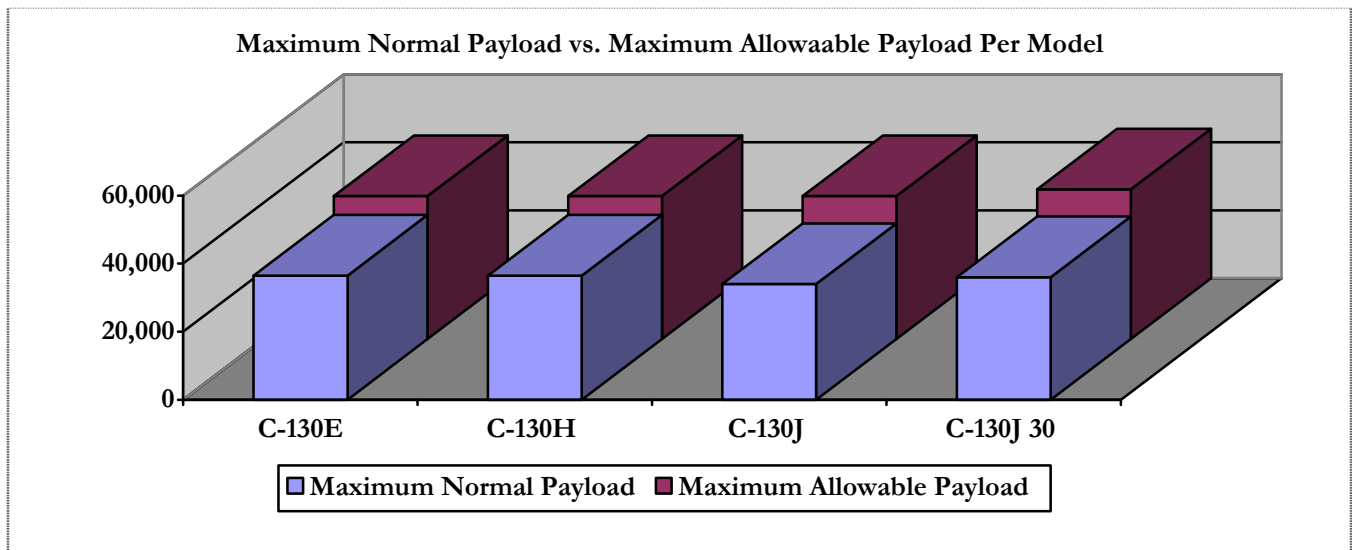
<sup>25</sup> DOD Director of Operational Test and Evaluation (DOT&E) Annual Report, Fiscal Year 2006 <http://www.cdi.org/PDFs/DOTE%20FY06%20report%20AF.pdf>, 183-184.

According to the Project on Government Oversight, older C-130 Hercules models had an excellent reputation as dependable; however, the C-130J has been reported to be notorious for its high maintenance requirements.<sup>26</sup> Statements to CDI by Defense Department specialists who are familiar with the C-130J performance in Iraq confirm these reports.

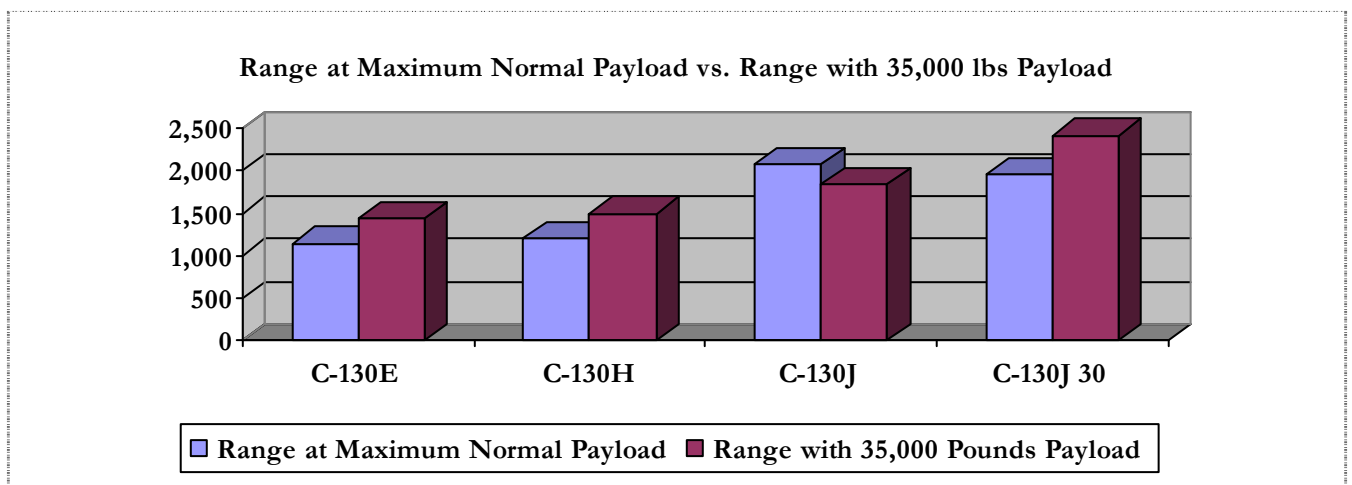
### Range, Payload, and Cost

Even if all C-130J problems were to be fully resolved and the aircraft were to perform as promised in every respect, it would remain a bad bargain for the Defense Department and the taxpayer. This is because the increase in cost for the C-130J far exceeds the increase in performance on two key criteria, range and payload.

Using data from the Air Force’s C-130 “fact sheet,” the following graph depicts the maximum normal payload and the maximum allowable payload for the C-130 E and H and two J models.

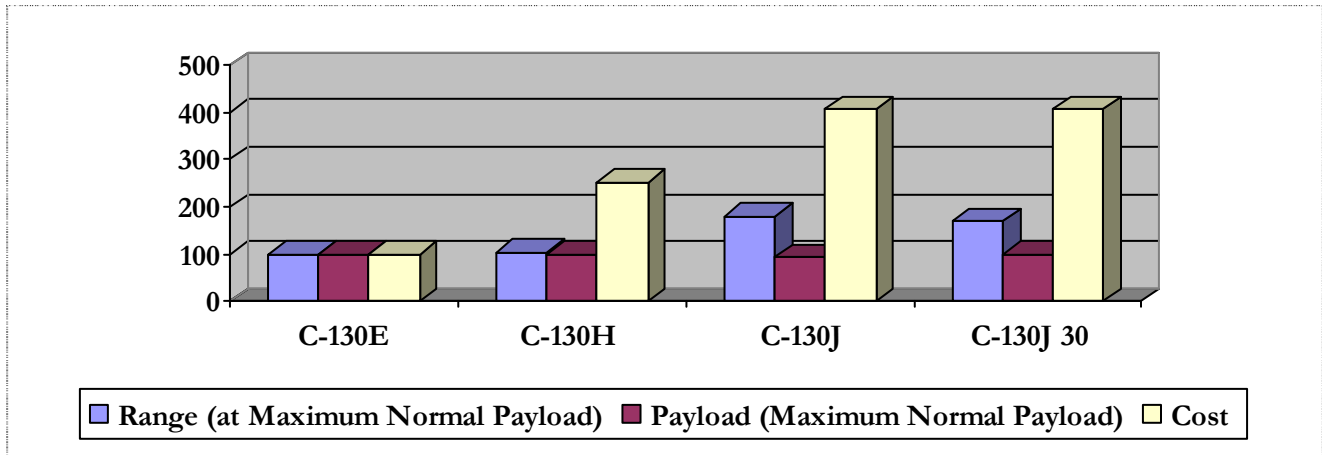


Below, we compare the same models on the measure of range, using the data in the same Air Force C-130 fact sheet.



<sup>26</sup> “Taxpayers Carry the Load: The C-130J Cargo Plane Does Not,” Project on Government Oversight, March 15, 2005, <http://www.pogo.org/p/defense/do-050301-C130J.html>.

This display below illustrates range and payload together with unit cost. The values shown are increases in percentage, using the Air Force’s own performance data and the favorable “flyaway” cost data in the Air Force’s fact sheet. Note the insignificant increases in payload and the moderate improvement in range for the “J” models compared to the huge cost increases. Apparently, the feature that has increased the most with the C-130J is cost, not performance. If more accurate total program unit cost from DOD Selected Acquisition Reports were to be used for the cost measure, the cost increase for the “J” model would be even more dramatic.



*Graphs prepared by the Center for Defense Information.*

Such comparisons, while not available in reports to or by Congress or in data from the Department of Defense, comprise the unavoidable basis to consider the C-130J to be cost **ineffective**.

**General Information on C-130J Aircraft Program:**

Air Force Technology <http://www.airforce-technology.com/projects/hercules/>

Air Force Link – Fact Sheet <http://www.af.mil/factsheets/factsheet.asp?fsID=92>

Defense Update <http://www.defense-update.com/products/c/C-130J.htm>

Wikipedia [http://en.wikipedia.org/wiki/C-130\\_Hercules](http://en.wikipedia.org/wiki/C-130_Hercules)

Globalsecurity.org <http://www.globalsecurity.org/military/systems/aircraft/c-130j.htm>

Lockheed Martin <http://www.lockheedmartin.com/products/c130/>

Lockheed Martin - C-130J Super Hercules: Whatever the Situation, We’ll Be There  
[http://www.c-130j.ca/document/Spec\\_Book.pdf](http://www.c-130j.ca/document/Spec_Book.pdf)

**Reports:**

DOD Director of Operational Test and Evaluation (DOT&E) Annual Report, Fiscal Year 2006  
<http://www.cdi.org/PDFs/DOTE%20FY06%20report%20AF.pdf>

DOD Office of the Inspector General Audit: “Contracting for and Performance of the C130J Aircraft,” July 23, 2004, <http://www.dodig.osd.mil/audit/reports/fy04/04102sum.htm>

**Analysis:**

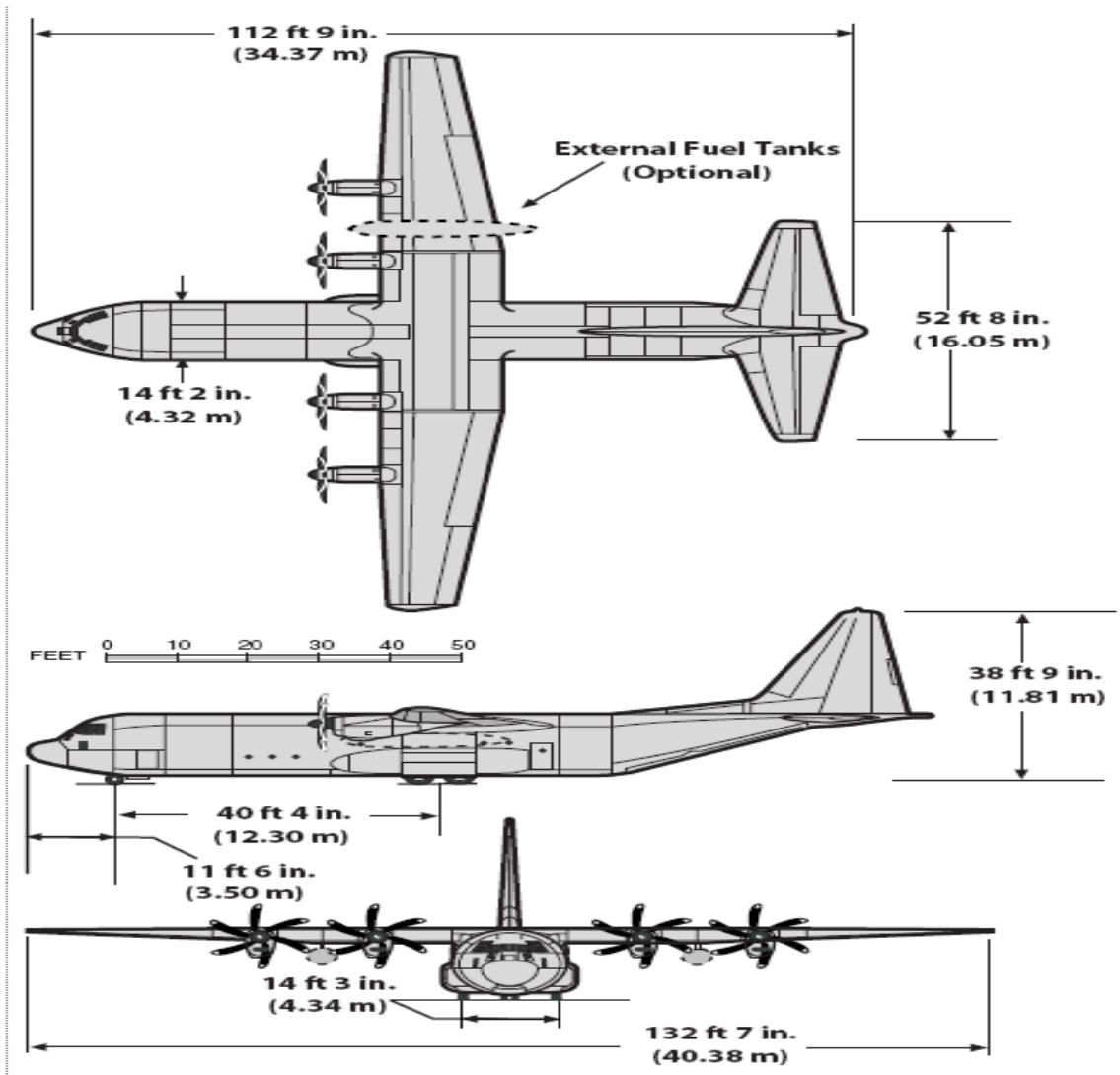
Government Executive.com

- Pentagon report criticizes new version of C-130J transport plane, <http://www.govexec.com/dailyfed/0105/012405cdpm3.htm>.

Project on Government Oversight

- Taxpayers Carry the Load: The C-130J Cargo Plane Does Not, <http://www.pogo.org/p/defense/do-050301-C130J.html>

**General Arrangement of the Lockheed Martin's C-130 J Model:**



The image used is from *Lockheed Martin Specifications Book*, titled “C-130J Super Hercules: Whatever the Situation, We’ll Be There,” and can be found online at:

[http://www.c-130j.ca/document/Spec\\_Book.pdf](http://www.c-130j.ca/document/Spec_Book.pdf).