United States Government Accountability Office

Report to Congressional Committees

July 2013

DEFENSE SUPPLIERS

Factors Affecting U.S. Titanium Aircraft Component Manufacturers' Market Share of DOD Business

GAO-13-539

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GAO Highlights

Highlights of GAO-13-539, a report to congressional committees

Why GAO Did This Study

Titanium is used in airframe components and jet engines, in part because it provides greater strength at lower weight than other metals. It is produced in a number of shapes, including bars, billets, and sheets. By law, U.S. manufacturers are generally required to use U.S. produced titanium for DOD aircraft components, unless an exception applies. One exception allows companies in 23 "qualifying countries" to use foreign produced titanium when manufacturing aircraft components for DOD. There is concern that U.S. manufacturers are losing market share to qualifying country manufacturers that are able to use foreign produced titanium.

The House Armed Services Committee report accompanying the National Defense Authorization Act for Fiscal Year 2013 mandated that GAO assess the ability of U.S. aircraft component manufacturers to compete for DOD contracts. In this report, GAO assessed (1) available data on titanium prices, (2) available data on U.S. and foreign manufacturers' market share of DOD aircraft component contracts, and (3) the factors that affect the ability of U.S. aircraft component manufacturers to compete for DOD contracts. GAO reviewed Census foreign trade data, the best proxy for titanium prices; federal procurement data; and relevant industry studies; and interviewed a broad range of government and industry officials.

What GAO Recommends

GAO is not making recommendations in this report. Agencies and third parties reviewed GAO's draft report and technical comments received were incorporated as appropriate.

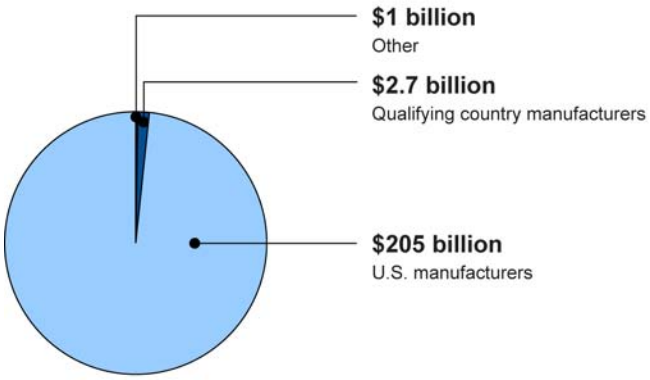
View GAO-13-539. For more information, contact Belva M. Martin at (202) 512-4841 or martinb@gao.gov.

What GAO Found

Census data show that U.S. and foreign produced titanium prices varied from 2003 through 2012 depending on the product. For example, in 2012, the export price (the proxy for the U.S. price) for titanium bar—used to make engine blades—was higher than the import price (the proxy for the foreign price), while the export price for titanium sheet—used to make wing components—was less than the import price. Industry officials noted that these differences may be due to varying operating costs and titanium production capabilities in different countries and to titanium producers' negotiated agreements with prime contractors or aircraft component manufacturers.

U.S. aircraft component manufacturers receive the majority of Department of Defense (DOD) business, whether through direct purchases by the department or through purchases made by its prime contractors. Based on obligation of procurement money, 98 percent of DOD's purchases of aircraft components went to U.S. manufacturers from fiscal years 2008 to 2012 (shown in the figure below). The remainder went to foreign manufacturers, primarily from qualifying countries. DOD prime contractors reported that over the past 10 years they have bought 70 to 100 percent of DOD titanium aircraft components from U.S. manufacturers.

DOD Aircraft Component Obligations to U.S. and Foreign Manufacturers, Fiscal Years 2008-2012



Source: GAO analysis of federal procurement obligation data.

Industry officials identified management of titanium sourcing and industry consolidation, rather than titanium price, as factors affecting competition between aircraft component manufacturers for DOD business. Prime contractors generally manage titanium sourcing decisions for their DOD component manufacturers through long term agreements and an approval process that often directs competing manufacturers to the same titanium source, thereby potentially reducing pricing advantages available to aircraft component manufacturers in qualifying countries. Many officials from aircraft component manufacturers also identified industry consolidation of the titanium producers and component manufacturers as a factor that could affect their access to titanium for DOD contracts, although they have not yet seen any adverse impacts.

Contents

Abbreviations

ATI	Allegheny Technologies Incorporated
DFARS	Department of Defense Federal Acquisition Regulation Supplement
DOD	Department of Defense
FPDS-NG	Federal Procurement Data System-Next Generation
RTI	RTI International Metals Incorporated
TIMET	Titanium Metals Corporation

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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Congressional Committees

Specialty metals, such as titanium and titanium alloys, are essential in the manufacture of critical Department of Defense (DOD) aircraft components, in part because they are lightweight, strong, and corrosion resistant. Since the early 1970s, DOD and its contractors have generally been required to acquire titanium produced in the United States for the production of aircraft components unless an exception applies. One such exception, known as the qualifying country exception, waives the requirement for procuring specialty metals produced in the United States if the acquisition relates to international agreements with other countries.[1] This qualifying country exception permits titanium aircraft component manufacturers in 23 "qualifying countries" to acquire titanium produced outside the United States, including titanium produced in non-qualifying countries, for use in DOD procurements.

The House Armed Services Committee report, accompanying the National Defense Authorization Act for Fiscal Year 2013, mandated that GAO assess the ability of U.S. aircraft component manufacturers to compete with manufacturers in qualifying countries that can obtain foreign produced specialty metals including titanium for DOD contracts.[2] In this report, we assessed (1) available data on U.S. and foreign produced titanium prices, (2) available data on U.S. and qualifying country

[1]10 U.S.C. § 2533b(d) waives the requirement to procure specialty metals from domestic sources if the acquisition relates to certain agreements with foreign governments. Implementing this provision, Department of Defense Federal Acquisition Regulation Supplement (DFARS) provides that aircraft or aircraft components containing specialty metals, including titanium and titanium alloys, that are not melted or produced in the United States may be acquired if the aircraft or components are manufactured in or contain titanium melted or produced in certain "qualifying" countries. Under DFARS, qualifying countries are those which have a reciprocal defense procurement memorandum of understanding or international agreement with the U.S. in which both countries agree to remove barriers to purchases of supplies produced in the other country and the memorandum or agreement complies, where applicable, to the Arms Export Control Act, 22 U.S.C. § 2776, and 10 U.S.C. § 2457, relating to standardization of equipment with North Atlantic Treaty Organization members. DFARS §§ 225.7003-3(b)(4); 225.7003-1(c); 225.003(10). For the purposes of this report, we refer to this as the qualifying country exception.

[2]H.R. Rep. No. 112-479, at 191 (2012).

manufacturers' market share of DOD aircraft component contracts, and (3) factors that affect the ability of U.S. aircraft component manufacturers to compete for DOD contracts.

To address our objectives, we analyzed U.S. Census Foreign Trade statistics data to determine U.S. export and import values of titanium metals from calendar years 2003 to 2012, which we determined were the best available proxy as no publicly available U.S. and foreign titanium price data are available. For the purposes of this report, Census export data serve as a proxy for U.S. produced titanium prices, while import data serve as a proxy for foreign produced prices. We compared these data to other industry information on prices, obtained concurrence from knowledgeable government officials that these data were the best available proxy, and determined that these data were sufficiently reliable for our purposes. We identified U.S. and qualifying country manufacturers' market share of DOD aircraft component contracts from fiscal years 2008, the year that DOD started collecting these data, through 2012 by analyzing data from the Federal Procurement Data System-Next Generation (FPDS-NG) using the relevant aircraft claimant codes, some of which may not include titanium, because FPDS-NG does not specifically identify components by their titanium content. We excluded contracts for services and items that were not identified as manufactured end products. We also excluded indefinite delivery contracts but included contract orders issued from those contracts. We compared the FPDS-NG data to data from DOD reports on supplies manufactured outside the United States that use the same source data and determined the data were sufficiently reliable for our purposes. To determine the market share for aircraft component subcontracts awarded by DOD prime contractors, we collected information from selected DOD program offices, aircraft and engine manufacturers, and manufacturers of titanium aircraft components—such as engine blades and rotating discs—for DOD products. We also reviewed relevant studies on the titanium and aircraft component industries. We supplemented our work with interviews with a broad range of officials from government agencies, the four major U.S. and foreign titanium producers, five of the six major DOD aircraft and engine prime contractors, as well as nine titanium aircraft component manufacturers primarily identified by prime contractors. Additional information about our scope and methodology can be found in appendix I.

We conducted this performance audit from September 2012 to July 2013 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our

findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Specialty Metals Domestic Source Restriction and Qualifying Country Exception

In 1941, Congress enacted the Berry Amendment, a domestic source restriction, which required that certain items procured for defense purposes be grown or produced in the United States.[3] Specialty metals, including titanium and titanium alloys,[4] were added to the Berry Amendment in the early 1970s, generally requiring DOD and its contractors to procure specialty metals produced or melted in the United States unless an exception applied allowing specialty metals from foreign countries.[5] In 1978, the "qualifying country exception" was added to the specialty metals domestic source restriction, which waived the requirement for procuring specialty metals produced in the United States when the purchase relates to agreements the United States has with foreign governments, known as "qualifying countries."[6] Under this exception, aircraft component manufacturers in 23 "qualifying countries" currently are exempt from the specialty metals domestic source restriction and are permitted to use non-domestic produced titanium to manufacture

[3]This domestic source restriction, which became known as the Berry Amendment, initially was enacted as part of the Fifth Supplemental National Defense Appropriation Act, 1941, Pub. L. No. 77-29, 55 Stat. 123, 125 (1941). Subsequently, it was included in various defense appropriation acts and was codified in the National Defense Authorization Act for Fiscal Year 2002 at 10 U.S.C. § 2533a, Pub. L. No. 107-107 § 832 (2001).

[4]Titanium alloys are metals mixtures that contain 50 percent or more titanium and one or more metallic elements, such as aluminum, or non-metallic, alloying elements. DFARS §§ 225.7003-1(c); 252.225-7008; 252.225-7009.

[5]The specialty metals provision of the Berry Amendment was enacted in the Department of Defense Appropriation Act, 1973, Pub. L. No. 92-570, § 724 (1972). Although the statute did not specifically define "specialty metals," DOD defined the term consistent with the pertinent report of the House Committee on Appropriations to include four categories of metals, including titanium and titanium alloys. DOD Secretary of Defense Memorandum, "Section 724 of the Department of Defense Appropriation Act, 1973" (Nov. 20, 1972). In 2006, the specialty metals provision was codified at 10 U.S.C. § 2533b. John Warner National Defense Authorization Act for Fiscal Year 2007, Pub. L. No. 109-364, § 842 (2006).

[6]Department of Defense Appropriation Act, 1978, Pub. L. No. 95-111, § 823 (1977).

DOD aircraft components.[7] Under the current version, the specialty metals domestic source restriction does not apply to aircraft or aircraft components manufactured in a qualifying country or aircraft or aircraft components containing specialty metals produced or melted in a qualifying country.[8] Table 1 lists the 23 qualifying countries.

Table 1: Qualifying Countries

Australia	France	Poland
Austria	Germany	Portugal
Belgium	Greece	Spain
Canada	Israel	Sweden
Czech Republic	Italy	Switzerland
Denmark	Luxembourg	Turkey
Egypt	Netherlands	United Kingdom of Great Britain and Northern Ireland.
Finland	Norway	

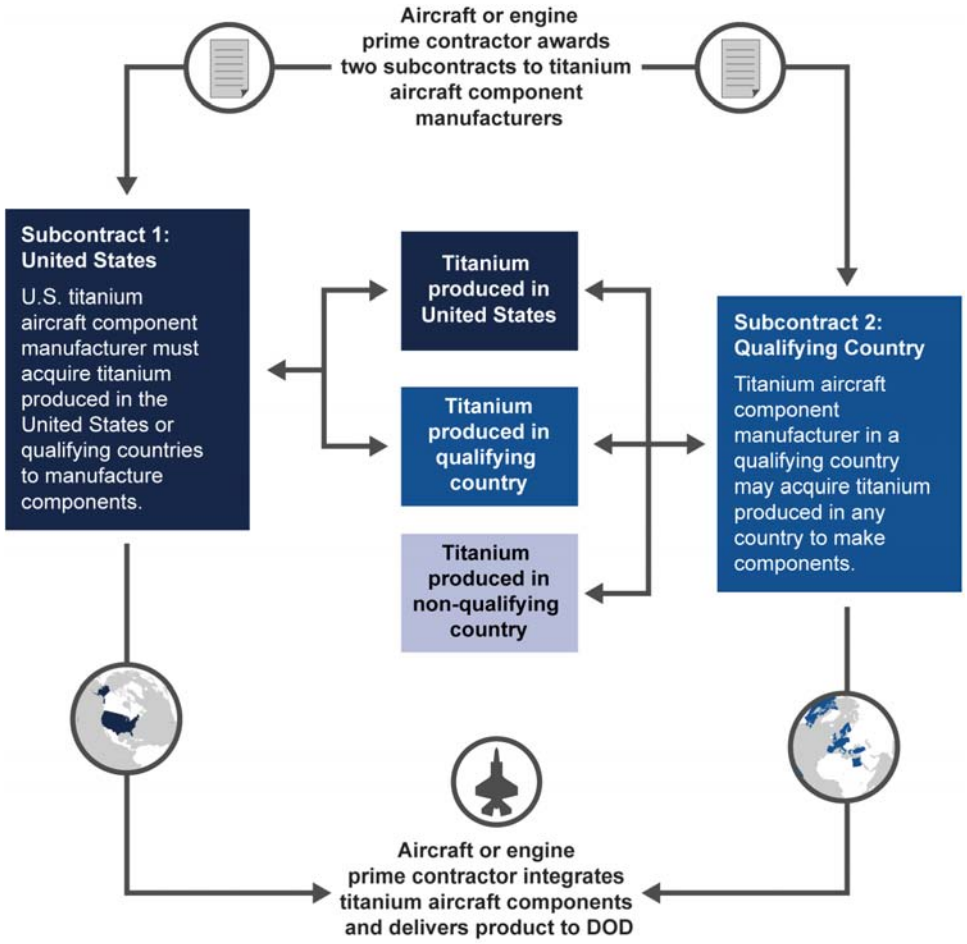
Source: GAO presentation of Defense Federal Acquisition Regulation Supplement (DFARS) § 225.003(10).

Under the qualifying country exception, manufacturers in the listed countries have greater flexibility when procuring specialty metals for DOD procurements than U.S. manufacturers. Specifically, they can procure specialty metals from any source—including non-qualifying countries—while a component manufacturer in the United States must procure specialty metals from a source in the United States or a qualifying country, as shown in figure 1.

[7]DFARS §§ 225.7003-3(b)(4); 225.7003-2(a); 225.003(10).

[8]DFARS § 225.7003-3(b)(4). DFARS provides that the exception may apply to an end item or component under a prime contract or a subcontract at any tier. DFARS § 225.7003-3(b).

Figure 1: Application of DOD Specialty Metals Clause and Qualifying Country Exception



Source: GAO analysis of 10 U.S.C. § 2533b(d), which is implemented in DFARS 225.7003-3(b)(4) (data); Map Resources (map).

In addition, there are other exceptions to the specialty metals domestic source restriction that allow DOD to procure items containing specialty metals, including titanium in aircraft or aircraft components, from manufacturers in qualifying and non-qualifying countries. For example, one such exception, known as the domestic non-availability exception, waives the specialty metals domestic source restriction when DOD makes a determination that specialty metals, including titanium in aircraft or

aircraft components, are not available in the United States in the required form and at a reasonable price.[9] Other exceptions waive the specialty metals domestic source restriction for purchases outside the United States in support of combat operations or purchases in support of contingency operations.[10]

Titanium and Aircraft Component Industry

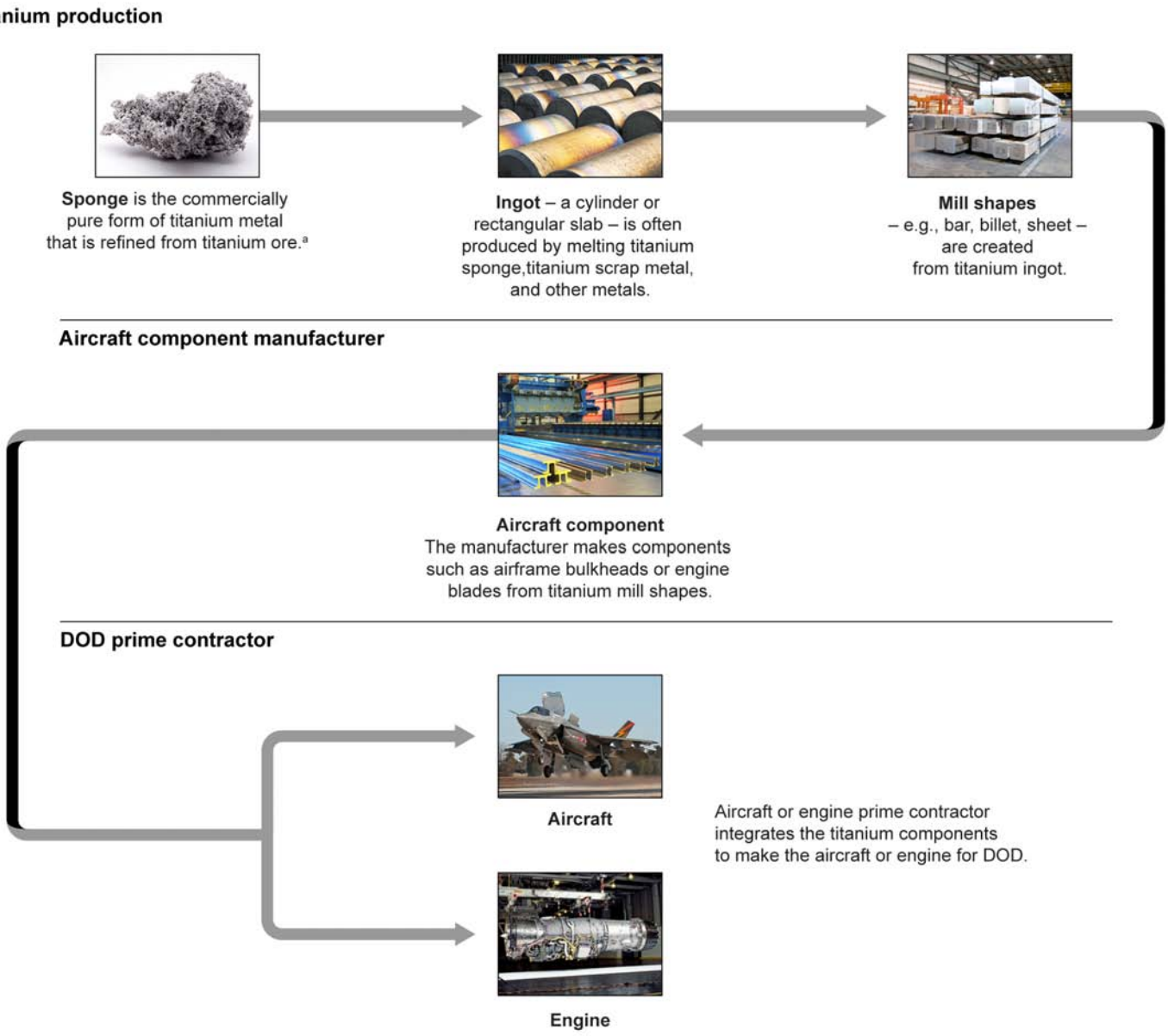
The commercial aerospace industry is the largest consumer of titanium metals in the world. DOD estimates that the aerospace industry accounts for 60 to 75 percent of the U.S. market, with military and DOD business accounting for up to 15 percent of the aerospace industry.[11] Titanium metals are important metals in the aircraft industry, in part because they are lightweight, strong, and corrosion resistant, making them common for use in structural airframe and jet engine components. In an airframe, titanium may be used in bulkheads, tail sections, landing gears, wing supports, and fasteners. In engines, titanium may be used in blades, rotating discs, rings, and casings. To manufacture a titanium aircraft component, there are multiple steps in the supply chain, from titanium production through the manufacturing of the finished component. Figure 2 provides an overview of the DOD titanium production and aircraft component manufacturing processes.

[9]Specifically, DFARS § 225.7003-3(b)(5) waives the specialty metals domestic source restriction when DOD makes a determination that the specialty metal melted or produced in the U.S. cannot be acquired as and when needed at a fair and reasonable price in a satisfactory quality, a sufficient quantity, and the required form.

[10]DFARS §§ 225.7003-3(a)(2) and (3).

[11]Department of Defense, Office of the Under Secretary of Defense Acquisition, Technology & Logistics Manufacturing and Industrial Base Policy, *Titanium Supply for Defense Uses,* (September 2011). The other percentage is used in medical and other devices.

Figure 2: DOD Titanium Production and Aircraft Component Manufacturing Processes



Source: GAO analysis of DOD and industry data (data), Lockheed Martin (aircraft image), Pratt & Whitney (engine image), RTI International Metals, Inc. (aircraft component and mill shapes images), and TIMET (sponge and ingot images).

[a]According to DOD, if titanium sponge is shipped to the United States for final smelting into ingots or finished stock, it is not subject to the specialty metals domestic source restriction at that stage of the process. The same is true for other unprocessed forms of titanium such as non-melt derived titanium powder or titanium alloy powder. Defense Federal Acquisition Regulation Supplement (DFARS) § 225.7003-2 and §§ 252.225.7008 and 252.225-7009.

There are a limited number of titanium producers in the world, and market shares are concentrated in a small number of large producers. Currently, there are four major worldwide producers of high-quality titanium for aerospace: one in Russia (Verkhnaya Salda Metallurgical Production Association) and three in the United States. These three major U.S. titanium metal producers—Allegheny Technologies Incorporated (ATI); RTI International Metals, Inc. (RTI); and Titanium Metals Corporation (TIMET)—account for 94 percent of the U.S. production capacity.[12] Due in part to the limits of worldwide production capacity, titanium products require a long lead time to produce, and manufacturers may order titanium metal years before it is expected to be delivered in a finished product to the customer.

For tactical aircraft and engines, DOD generally contracts with six prime contractors—Boeing, Lockheed Martin, Northrop Grumman, General Electric, Pratt & Whitney, and Rolls-Royce—the latter three for engines. These prime contractors generally rely on aircraft component subcontractors to produce titanium aircraft components. Prime contractors or aircraft component manufacturers generally purchase titanium from one of the four major titanium producers. As described above, when selling components to DOD, the specialty metals domestic source restriction limits the U.S. prime contractors' and aircraft component manufacturers' purchase of titanium to one of the U.S. or other qualifying country sources. Qualifying country aircraft component manufacturers that sell to DOD have the flexibility to source titanium from any producer, including a non-qualifying country source.

[12]Department of the Interior, U.S. Geological Survey, *2011 Minerals Yearbook: Titanium [Advance Release]* (April 2013).

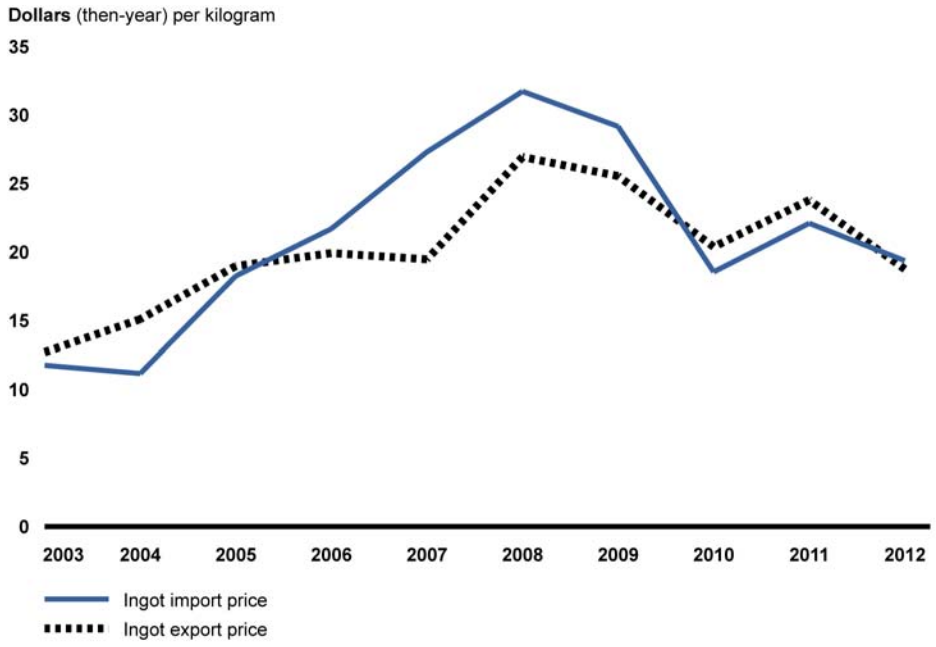
U.S. and Foreign Titanium Price Differences Varied By Product Type

Census data from calendar years 2003 to 2012 show variations in U.S. and foreign produced titanium prices for ingot, bar, billet, and sheet.[13] Data for ingot—the titanium form used to produce mill shapes—show that U.S. export and import prices have varied over the last 10 years.[14] The import price was $3.93 less per kilogram than the export price in 2004, while the export price was $7.84 lower per kilogram than the import price in 2007. In 2011 and 2012, export and import prices converged, as seen in figure 3.

[13]Harmonized system codes that identified products as bar, billet, and sheet in the Census data changed in 2004, according to Census officials. To maintain a consistent data set, we limited our analyses to calendar years 2005 through 2012 for these products. For ingot, a consistent data set was available for calendar years 2003 through 2012. The harmonized system codes used by Census for bar includes "bars, rods, profiles, and wire of titanium" and for sheet includes "blooms, sheet bars, and slabs of titanium." For the purposes of this report, we refer to these commodity groupings as bar and sheet, respectively.

[14]The Census import data values represent the prices paid by U.S. customers to import foreign produced titanium metals, including applicable duty values. The Census export data values represent the selling price of titanium produced in the United States and purchased by customers outside the United States. We compared the Census import and export values to understand the relative price differences between foreign and U.S. produced titanium.

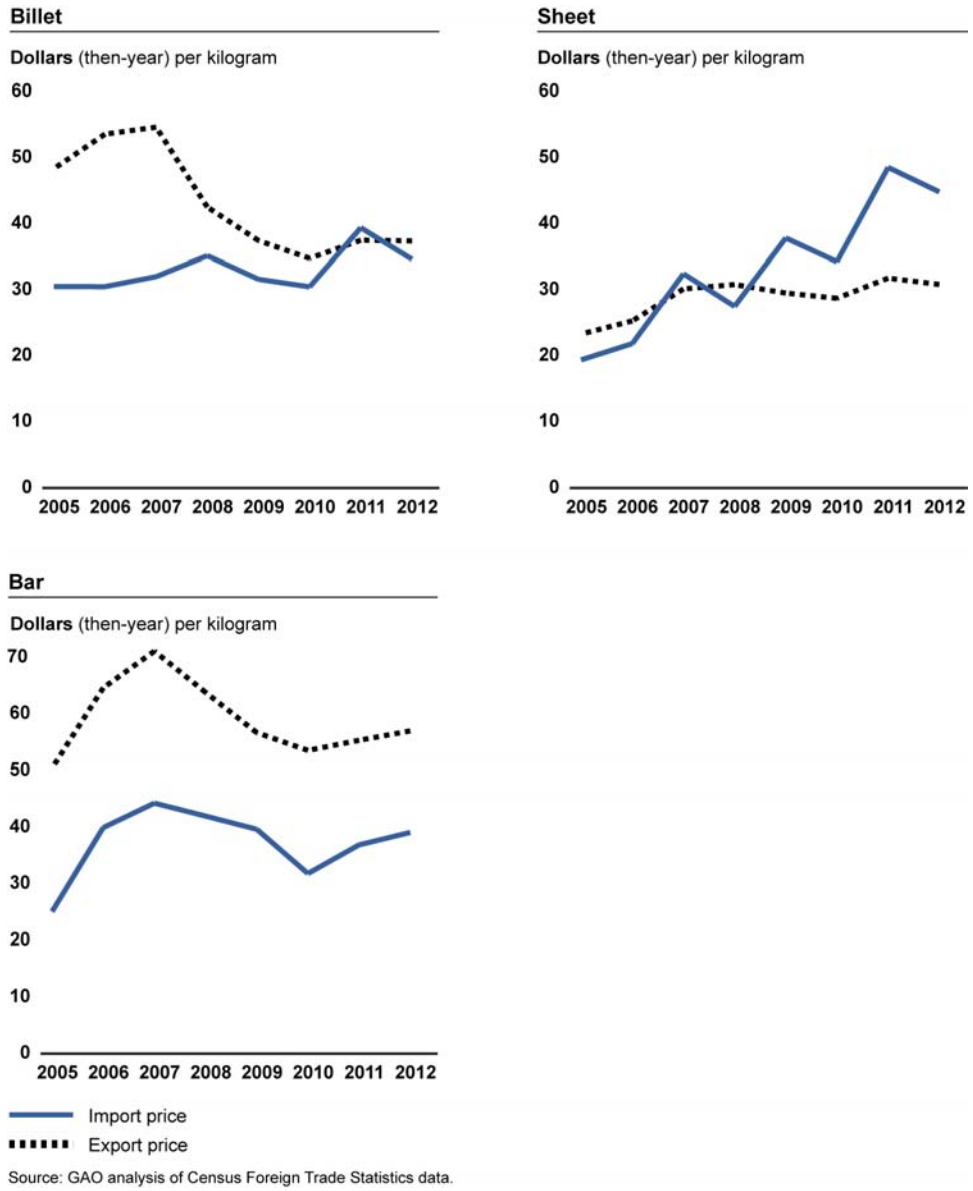
Figure 3: Titanium Ingot Export and Import Prices, 2003-2012



Source: GAO analysis of Census Foreign Trade Statistics data.

Census data also show that import and export price differences for mill shapes—the titanium shapes made from ingot and used to manufacture aircraft components—have also varied over the past 8 years. Specifically, the import prices for billet—used to make rotating disk engine components—have, with the exception of 2011, remained less than export prices over the past 8 years; however, the price difference has been reduced from $17.82 per kilogram in 2005 to $2.77 per kilogram in 2012. Price differences for sheet—used to make wing components—have also varied over the last 8 years, with the import price exceeding the export price from 2009 to 2012. The import price of bar—used to make engine blade components—has consistently remained significantly lower than the export price over the last 8 years. Figure 4 shows the historical import and export prices of titanium billet, sheet, and bar.

Figure 4: Titanium Import and Export Prices for Mill Shapes, 2005-2012



Source: GAO analysis of Census Foreign Trade Statistics data.

Relevant reports and government and titanium industry officials we interviewed attribute overall price variations to changes in global demand and the supply capacity of titanium producers to meet demand. Industry officials also told us that price differences between the U.S. and foreign produced titanium products can be driven in part by differences in

operating costs and production capabilities between U.S. and foreign producers. In addition, officials told us that price differences between titanium products, such as bar and billet, can partly be due to the increased number of steps needed to produce one over the other.

While price differences between U.S. and foreign titanium can be large—for example, in 2005, Census bar import price was $25.02 per kilogram and export price more than twice that at $50.37 per kilogram—officials from prime contractors and aircraft component manufacturers told us that price differences have not been large enough to have a significant impact on the cost of a DOD aircraft. For example, data in one DOD study show that a 50 percent increase in the price of titanium would result in about a 1 percent increase in the cost of a DOD aircraft, because titanium cost is generally a small percentage of the overall aircraft cost. Furthermore, prices are typically negotiated through private agreements and can depend on the specific terms of the agreement between the customer and producer. In addition, industry officials noted that U.S. produced titanium has been competitively priced relative to foreign produced titanium.

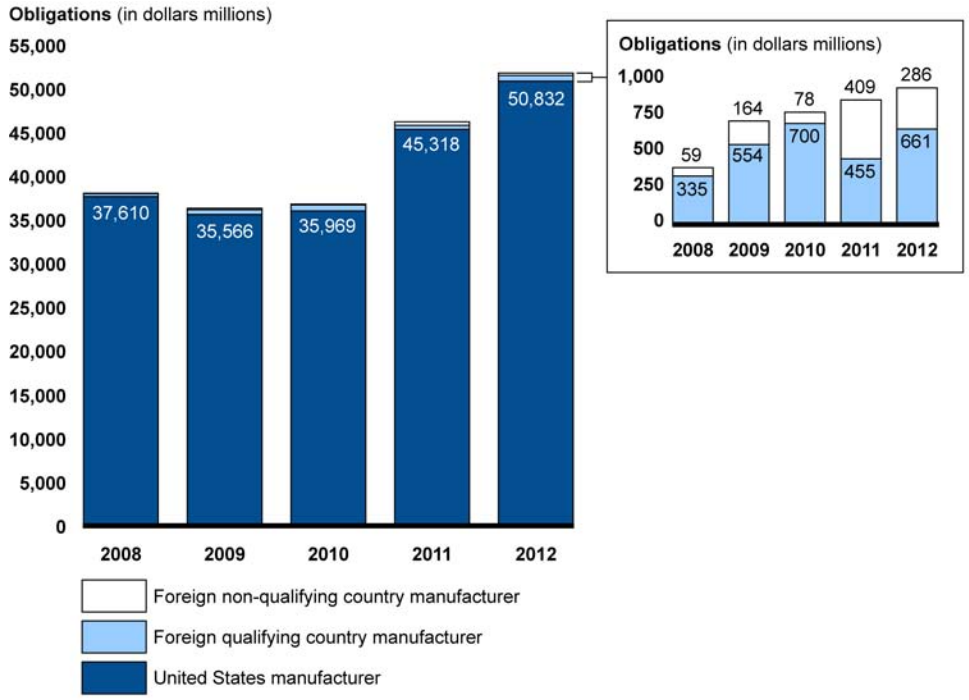
U.S. Manufacturers Have the Majority of DOD's Aircraft Component Business

DOD can either directly contract for aircraft components or contract with prime contractors that in turn buy them from component manufacturers. DOD awarded the majority of aircraft component contracts to U.S. manufacturers from fiscal years 2008 through 2012. Specifically, FPDS-NG data over the past 5 years show that DOD directly obligated a total of $209.6 billion for aircraft component contracts.[15] This includes all contracts for aircraft components, some of which may not contain titanium. Of the $209.6 billion, DOD obligated $205.3 billion, or 98 percent, of these purchases to U.S. manufacturers. Additionally, DOD obligated $2.7 billion, or 1.3 percent of the total obligations, to manufacturers in qualifying countries. While obligations to manufacturers in qualifying countries increased from $335 million in 2008 to $661 million in 2012, their market share of DOD obligations remained between approximately 1 to 2 percent each year. Through other authorities available to DOD, the department obligated $1 billion to manufacturers in

[15]This total excludes contracts for services and items that were not identified as manufactured end products. We also excluded underlying indefinite delivery contracts which do not specify place of manufacture, but included subsequent contract orders which do specify place of manufacture.

non-qualifying countries.[16] As shown in figure 5, U.S. manufacturers have consistently been awarded the majority of DOD aircraft component obligations each year from fiscal years 2008 through 2012.

Figure 5: DOD Aircraft Component Obligations to U.S. and Foreign Manufacturers, Fiscal Years 2008-2012



Source: GAO analysis of FPDS-NG obligation data.

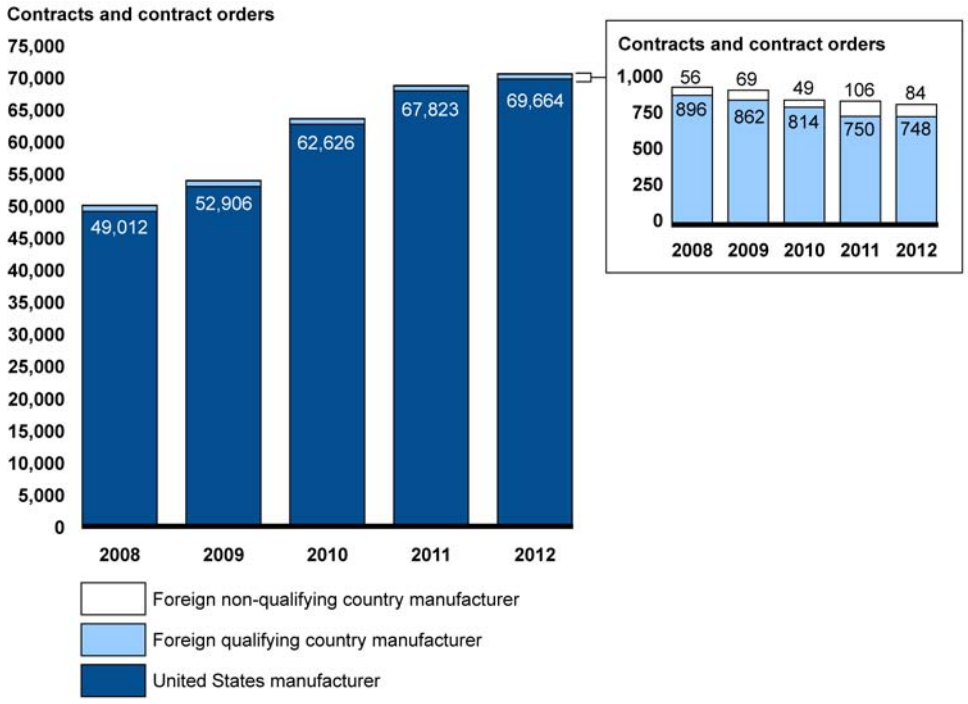
Similar to obligations, FPDS-NG data also show that DOD awarded the majority of aircraft component contracts and contract orders to U.S. manufacturers from fiscal years 2008 through 2012. Specifically, DOD awarded 306,465 contracts and contract orders for aircraft components.[17]

[16]FPDS-NG did not identify the place of manufacture for an additional $559 million, or 0.3 percent of all aircraft component obligations.

[17]This includes all aircraft component contracts and excludes contracts for services and items that were not identified as manufactured end products. We also excluded underlying indefinite delivery contracts that do not specify place of manufacture, but included subsequent contract orders that do specify place of manufacture.

DOD awarded over 98 percent, or 302,031, of these contracts and contract orders to U.S. manufacturers. The remaining 1.4 percent consisted of awards to both qualifying and non-qualifying country manufacturers. While total awards increased from 2008 to 2012, awards to manufacturers in qualifying countries consistently decreased each year from 896 awards in 2008 to 748 awards in 2012. As shown in figure 6, U.S. manufacturers have consistently been awarded the majority of DOD aircraft component awards and contract orders each year from fiscal years 2008 through 2012.

Figure 6: DOD Aircraft Component Awards to U.S. and Foreign Manufacturers, Fiscal Years 2008-2012



Source: GAO analysis of FPDS-NG data.

In addition to DOD's direct purchases of aircraft components, officials from aircraft and engine prime contractors told us that they purchase aircraft components from manufacturers for use in DOD programs. They generally noted that over the last 10 years they have sourced from 70 to 100 percent of titanium components for DOD aircraft from U.S. manufacturers, depending on the DOD program and specific component. For example, officials from DOD and one prime contractor said that the

F-35 Lightning II program has increased the use of qualifying country suppliers, because it is an international program with eight partner countries participating in the program. Alternatively, company officials involved in the F-22 Raptor program told us that they sourced 100 percent of components from U.S. manufacturers due to export restrictions. Officials from DOD prime contractors also reported there are a limited number of manufacturers outside the United States that have the capabilities necessary to supply titanium aircraft components for DOD.

Factors Other Than Titanium Price Affect the Ability of U.S. Aircraft Component Manufacturers to Compete for DOD Business

Industry officials told us that prime contractors' long term agreements, prime contractors' approval of titanium producers, and industry consolidation—rather than titanium price—are major factors affecting the ability of U.S. aircraft component manufacturers to compete for DOD contracts. Prime contractors generally manage titanium sourcing decisions for their DOD component manufacturers through long term agreements for titanium that include pre-negotiated prices. Additionally, DOD prime contractors can also require their component manufacturers to purchase titanium from producers that they have approved. Prime contractors' use of these methods to manage titanium sourcing may reduce potential pricing advantages from the titanium sourcing flexibilities that are available to manufacturers in qualifying countries. In addition, many officials from aircraft component manufacturers identified industry consolidation as a factor that could affect their ability to compete. However, they did not identify competition for DOD contracts from manufacturers in qualifying countries with potential pricing advantages from titanium sourcing flexibilities as a major factor.

According to industry officials, DOD aircraft and engine prime contractors leverage their buying power by arranging long term agreements with titanium producers to ensure titanium availability and pre-negotiated prices. These arrangements usually specify titanium product, price, quantity, and delivery schedule. In turn, prime contractors can then direct their titanium aircraft component manufacturers in the United States or in qualifying countries to purchase titanium under these agreements. For example, with rotating components which are strictly controlled, the prime contractors require component manufacturers to use the titanium from the agreement to ensure quality. As such, potential price differences between U.S. produced and foreign produced titanium would not impact the ability of U.S. component manufacturers to compete with manufacturers in qualifying countries if all manufacturers buy titanium from the same agreement. For example, the prime contractor for the F-35 Lightning II has negotiated a long term agreement with a U.S. titanium producer to supply titanium at a pre-negotiated price for the airframe of the F-35

Lightning II. Given this, industry and government officials told us that aircraft component manufacturers working for the prime contractor on the F-35 Lightning II airframe buy titanium from the U.S. producer at the prime contractor's pre-negotiated price.

Industry officials also told us that DOD aircraft and engine prime contractors often direct DOD aircraft component manufacturers to specific titanium producers that they have approved. These officials noted that as a part of the approval process prime contractors typically require titanium producers to undergo a certification process that can be costly and take over a year to ensure titanium quality. Prime contractors then direct their aircraft component manufacturers to use titanium only from an approved producer regardless of whether the aircraft component manufacturer is located in the United States or a qualifying country. For example, officials from one prime contractor told us that their company has only approved U.S. titanium producers for DOD aircraft components and therefore they are certain all titanium for their components are sourced from the United States, even if the component manufacturer is located in a qualifying country. Additionally, officials told us that in some cases prime contractors require titanium to be produced by specific processes for DOD products. For example, one prime contractor told us that it requires its titanium to be produced by cold hearth melting for any components that rotate on its DOD aircraft. According to this prime contractor, currently only two U.S. titanium producers can meet this requirement. Consequently, aircraft component manufacturers in the United States and qualifying countries producing DOD rotating components for this prime contractor must use titanium from one of these U.S. producers to meet the prime contractor's requirement.

Lastly, many of the officials from DOD titanium aircraft component manufacturers that we spoke with identified consolidation between the titanium production and aircraft component manufacturing industries as affecting their ability to compete more than competition from manufacturers in qualifying countries that may have titanium pricing advantages. According to these officials, before consolidation, companies generally performed one step in the processes of producing titanium, manufacturing titanium aircraft components, or assembling a final product for DOD. Thus, component manufacturers had relatively equal access to titanium producers. In recent years, two of the three major U.S. titanium producers have consolidated with aircraft component manufacturers. These consolidations enable one company to perform multiple steps such as producing titanium and manufacturing aircraft components. Officials from manufacturers that have not consolidated told us that they are

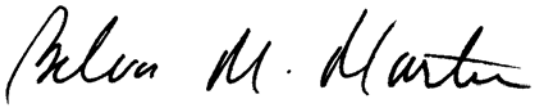
concerned about their access to titanium from producers that have consolidated with competing aircraft component manufacturers. However, they have not yet seen the impact of industry consolidation on their companies. Moreover, one official from a non-consolidated titanium aircraft component company told us that prime contractors' sourcing decisions would most likely continue to guarantee access to titanium for his company.

Agency and Third-Party Comments

We provided a draft of this report to DOD, Commerce, Interior, and Labor for their review and comment. Interior provided technical comments that we incorporated, as appropriate. DOD, Commerce, and Labor did not provide comments. To help ensure accuracy, we also provided pertinent sections of the draft to companies with which we spoke and received clarifying comments which we incorporated as appropriate.

We are sending copies of this report to interested congressional committees, as well as the Secretaries of Defense, Commerce, and the Interior, and Acting Secretary of Labor. In addition, the report will be available at no charge on GAO's website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-4841 or martinb@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix II.



Belva M. Martin
Director
Acquisition and Sourcing Management

List of Committees

The Honorable Carl Levin
Chairman
The Honorable James M. Inhofe
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Dick Durbin
Chairman
The Honorable Thad Cochran
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Howard P. “Buck” McKeon
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable C.W. “Bill” Young
Chairman
The Honorable Pete Visclosky
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Appendix I: Scope and Methodology

To evaluate available data on U.S. and foreign produced titanium prices, we reviewed multiple sources of titanium price data including American Metal Market and Global Insight. These sources do not distinguish titanium prices by the titanium producer or the place of production; therefore these data do not allow for a comparison of U.S. and foreign produced titanium prices. We determined that U.S. Census Foreign Trade Statistics titanium export and import values were the best available proxy for U.S. and foreign produced titanium prices. We identified four harmonized system commodity codes in the Census data that identify titanium products that can be used to produce titanium aircraft components: (1) ingots; (2) billets; (3) bars, rods, profiles, and wire; and (4) blooms, sheet bars, and slabs. For the purposes of this report, we refer to "bars, rods, profiles, and wire" as bar and "blooms, sheet bars, and slabs" as sheet. We used the Census values from calendar years 2003 to 2012 for titanium ingot and from 2005 to 2012 for titanium billet, sheet, and bar. The harmonized system codes that identified products as bar, billet, and sheet in the Census data changed in 2004. To maintain a consistent data set, we limited our analyses to calendar years 2005 through 2012 for these products. The export values represent the selling price of U.S. produced titanium metal. The import values represent the price a U.S. manufacturer would pay for titanium from a foreign titanium producer, and therefore includes duties paid in addition to the value of the titanium product. To verify the appropriateness of these data as proxies, we compared the Census values to other available industry price information, obtained concurrence from knowledgeable government officials that these data were the best available proxy, and determined that these data were sufficiently reliable for our purposes.

To identify qualifying country manufacturers' market share of Department of Defense (DOD) aircraft component contracts, we analyzed available data from the Federal Procurement Data System-Next Generation (FPDS-NG) from fiscal years 2008, the year DOD started collecting data on the use of the qualifying country exception, through 2012. For the purposes of this report, we identified aircraft related contracts as those designated by DOD claimant codes, A1A Airframe and Spares, A1B Aircraft Engines and Spares, and A1C Other Aircraft Equipment, some of which may not include titanium, because FPDS-NG does not specifically identify components by their titanium content. These claimant codes include components such as complete aircraft, airframe assemblies, wing assemblies, landing gears, aircraft engine and parts, aircraft instruments and parts, electrical equipment, and other accessories and parts readily identifiable for aircraft use. We excluded contracts for services and items that were not identified as manufactured end products. We also excluded

indefinite delivery contracts, because they do not specify the place of origin in the contract. However, we included orders issued off of those contracts, because they do specify the place of origin in the orders. Countries listed in the Defense Federal Acquisition Regulation Supplement (DFARS) § 225.003(10) were considered qualifying countries for this analysis. Overall market shares are based on the place of origin and place of manufacture fields in FPDS-NG. We compared the FPDS-NG data to DOD reports on supplies manufactured outside the United States and determined the data were sufficiently reliable for our purposes. To determine the market share for component subcontracts awarded by DOD prime contractors, we collected information from selected DOD program offices, aircraft and engine manufacturers, manufacturers of titanium aircraft components—such as engine blades and rotating discs—for DOD products. We also reviewed relevant studies on the titanium and aircraft component industries.

To identify the factors that affect the ability of U.S. aircraft component manufacturers to compete for DOD contracts, we reviewed relevant industry studies and interviewed government and industry officials. We interviewed officials from DOD offices including Acquisition, Technology and Logistics; Manufacturing and Industrial Base Policy; Defense Logistics Agency; and the Defense Contract Management Agency Industrial Analysis Center as well as officials from Department of the Interior's U.S. Geological Survey and the Department of Labor's Bureau of Labor Statistics. We also interviewed a broad range of relevant industry officials from the four major U.S. and foreign titanium producers, five of the six major DOD aircraft and engine prime contractors, relevant industry associations, and nine titanium aircraft component manufacturers. These aircraft component manufacturers were identified by prime contractors.

We conducted this performance audit from September 2012 to July 2013 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

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Staff Acknowledgments

In addition to the contact named above, John Neumann, Acting Director; James Kim; Beth Reed Fritts; Tana Davis; Keo Vongvanith; Julia Kennon; Marie Ahearn; Roxanna Sun; Danielle Greene; Namita Bhatia Sabharwal; and Amy Abramowitz made key contributions to the report.