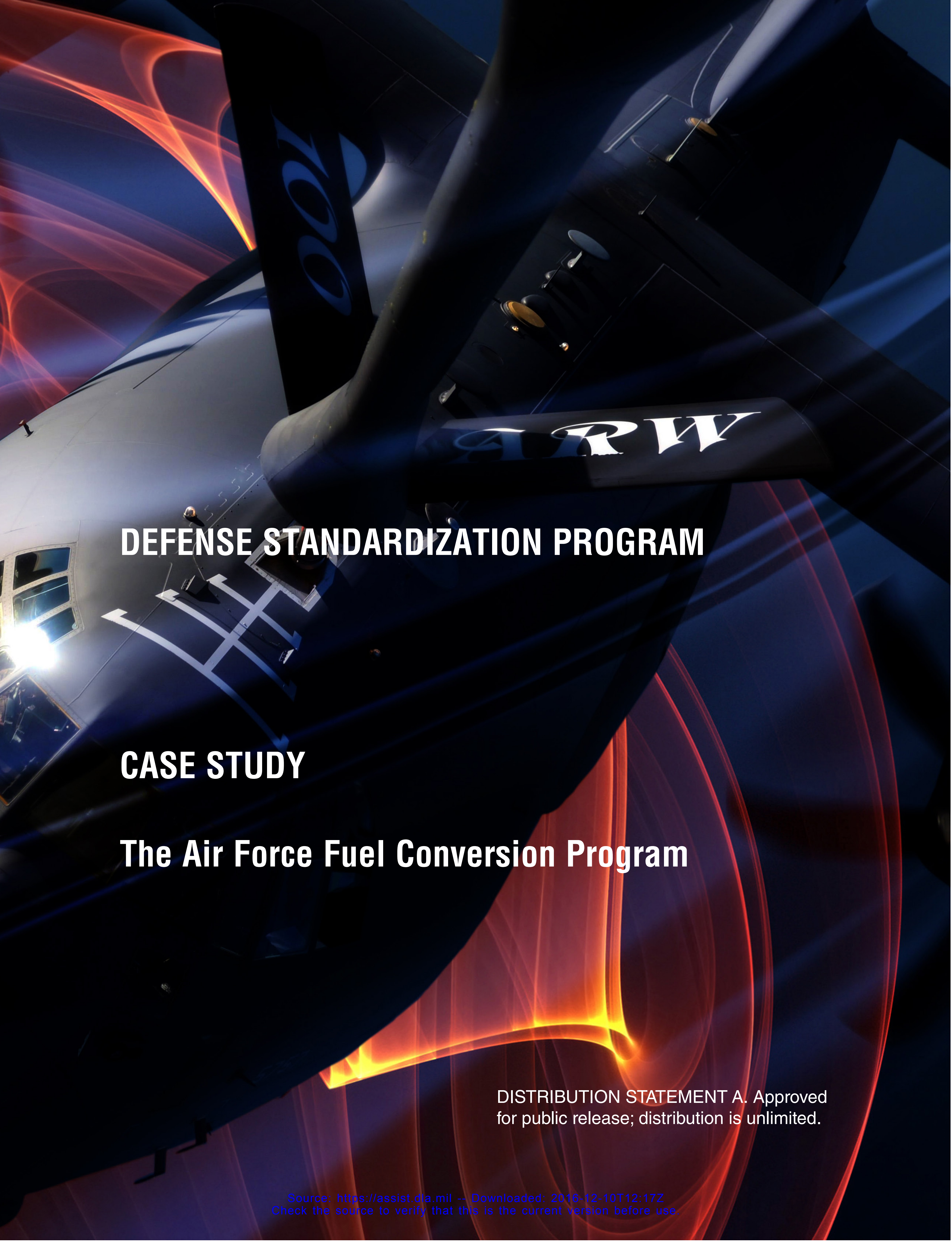

DEFENSE STANDARDIZATION PROGRAM

CASE STUDY

The Air Force Fuel Conversion Program

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This case study describes a joint effort by the U.S. Air Force (USAF) and Defense Logistics Agency (DLA) Energy to convert from a military jet propellant (JP) fuel, JP-8, specified by MIL-DTL-83133, to the more readily available commercial jet fuel, Jet A, specified by ASTM D1655. The conversion from a military fuel to a commercial fuel will increase the agility of the services and DLA to meet military requirements while simultaneously saving DoD millions of dollars annually.

Defense Standardization Program Case Study

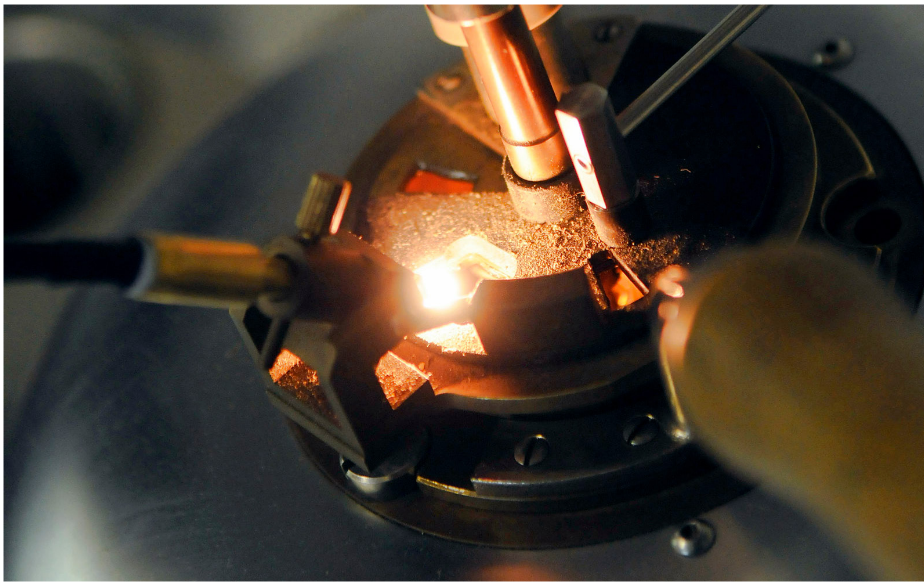
The Air Force Fuel Conversion Program

Background

In the 1940s, the aircraft turbine engine, developed independently in Germany and Britain in the 1930s, emerged as an answer to the quest for more power and speed for military aircraft. Kerosene was chosen as the fuel for those engines, mainly because of its ready availability.

Since 1944, military jet aircraft have used JP fuels produced to U.S. military specifications (MilSpecs). The JP fuels have evolved over the years to address availability or operational issues. For example, JP-1 was a pure kerosene fuel with a low freezing point and a high flash point (the temperature at which the fuel ignites). JP-1 was soon superseded by JP fuels that were kerosene-naphtha mixes (with different freezing points or flash points) or kerosene-gasoline blends spanning kerosene's and gasoline's boiling ranges. Those blends, referred to as "wide-cut" fuels, included JP-2, JP-3, and JP-4. JP-2 and JP-3 quickly became obsolete because of their operational disadvantages, such as their higher volatility, leading to greater losses due to evaporation at high altitudes and greater risk of fire during handling on the ground. JP-4, which had a lower flash point, became the standard fuel of the Air Force and Army Aviation starting in 1951 and, at one time, constituted 85 percent of the turbine fuels used by DoD. It was phased out in the 1990s in favor of JP-8—a middle-distillate fuel for most military turbine-powered air vehicles—due to the desire for a less flammable, less hazardous fuel. NATO forces also converted to JP-8 fuel (NATO F-34) in the 1990s.

In April 2004, the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics issued DoD Directive (DoDD) 4140.25, "DoD Management Policy for Energy Commodities and Related Services," requiring the military services to use a single kerosene-based fuel in all theaters, CONUS and OCONUS. Specifically, the directive designated JP-8 as the "single fuel on the battlefield" to be used by the Air Force and Army. DoD obtained a National Security Exemption to the Clean Air Act from the EPA to use JP-5/8 in ground vehicles. JP-8 contains three additives designed to enhance performance in a military environment:



- Fuel system icing inhibitor (FSII)
- Corrosion inhibitor/lubricity improver (CL/LI)
- Static dissipater additive (SDA).

In addition, DoDD 4140.25 designates JP-5, a high-flash-point kerosene-based fuel, as the primary fuel for sea-based aircraft; JP-5 fuel is required because of safety considerations in storing and handling fuel aboard ships. A third jet fuel, JP-7, also kerosene based, was developed for use in supersonic aircraft. **Table 1** lists the MilSpec jet fuels currently in use (along with their NATO counterparts) and summarizes their key characteristics.

DLA Energy has the mission of obtaining fuel for all of DoD's services and agencies, for both CONUS and OCONUS use. DLA relies on its general procurement authority under 10 United States Code § 2304 (competition requirement). DLA typically awards bulk petroleum contracts and direct delivery fuel contracts based on the lowest cost at the point of delivery, usually for 1 year, providing its customers a stabilized price during that year. DLA's fixed-price contracts provide the flexibility needed to meet changing operational requirements from year to year. DLA uses an economic price adjustment clause that provides for upward and downward price revisions. Revisions of the stated contract price are based on specified contingencies. This allows DLA to take advantage of swings in fuel prices. If prices decline, DLA's costs decline. If prices rise, the economic clause adjusts DLA's cost upward to the going market rate. DLA bases contract delivery price on the lowest cost to the government.

Most of DLA Energy's bulk fuel purchases are for jet fuel, with the Air Force being the largest consumer by far. According to the Air Force Petroleum Agency (AFPET), USAF purchased 2.7 billion gallons of JP-8 in 2010, but only 1.28 billion gallons of jet fuel in 2014, as fuel usage has been decreasing since 2011.

Table 1. Jet Fuels Used by U.S. and NATO Military Services

Fuel	Specification	Type	Freezing point	Flash point	Comments
JP-5 F-44 (NATO)	MIL-DTL-5624	Kerosene	–46° C	60° C	Was developed in 1952. Is used for operations aboard Navy aircraft carriers. Has a high flash point, allowing for safer storage on ships due to reduced fire risk. Minimizes vapor exposure of personnel.
JP-7	MIL-DTL-38219	Kerosene	–43° C	60° C	Was developed in 1955 for use in supersonic aircraft. Has low volatility, low vapor pressure, and high thermal stability to cope with the heat and stresses of high-speed flight.
JP-8 F-34 (NATO)	MIL-DTL-83133	Kerosene	–47° C	38° C	Was developed in 1979. Is the jet fuel most widely used by U.S. military services, primarily USAF and Army. Is also used exclusively by NATO forces. Contains FSII, CL/LI, and SDA to enhance fuel performance in a military environment.

Problem

JP-8 had been projected to remain in use at least until 2025. However, in the last two decades, the available supply of JP-8 has shrunk, affecting the agility of the military services and DLA in meeting warfighter requirements. At the same time, fuel costs have increased substantially.

JP-8 Availability

About 140 refineries operate in the United States. Generally, refineries are set up to process specific grades of crude oil, for example, light sweet or heavy sour, and produce a specific mix of products, including light distillates (liquid petroleum gas and gasoline), middle distillates (diesel fuels, aviation fuels, and residential heating fuel), and heavy distillates (heavy fuel oils).

A refinery can chemically process certain fractions of the crude oil to adjust the yield of a given product. Typically, gasoline represents 40 percent to 50 percent of the output from a barrel of crude, while jet fuel accounts for 4 percent to 8 percent of the output, depending on the type of crude oil processed and the market demand for gasoline. Of the jet fuel produced annually in CONUS (about 26 billion gallons in 2007), MilSpec jet fuel, JP-8, represents 6 percent, and the primary commercial jet fuel, Jet A, represents 94 percent.

Refineries have become increasingly reluctant to produce JP-8. That reluctance is based purely on business decisions. Specifically, because of its fuel freezing point and additives, JP-8 must be segregated from Jet A, which has a higher freezing point and no additives. Not only does JP-8 need to have dedicated storage, but it also requires segregated handling throughout the supply chain. For example, the JP-8 fuel supply chain operation uses commercial cross-country pipelines to deliver jet fuel to Defense Fuel Support Points (DFSPs). This requires scheduling the transport of batches of MilSpec fuel within the same pipelines used to transport commercial-grade jet fuel. Additional infrastructure, such as breakout storage tanks, is required to ensure that the pipeline trans-mix product was removed prior to the induction of MilSpec jet fuel into base inventory. The trans-mix of commercial and MilSpec fuel also imposes an additional cost for proper disposal.

Because of the logistical complexity, the required segregation effort, and the associated costs of moving a comparatively small volume of specialized fuel in a fungible transportation system, some suppliers have opted out of the MilSpec fuel market. For example, when DLA attempted its 2009–10 Inland East/Gulf Coast procurement of JP-8, it received no offers for its 54 million gallon JP-8 requirement. As a result, DLA had to regrade JP-5 and transport JP-8 from Greece to cover the requirement at a combined cost of $5.5 million. It also increased its purchases of commercial jet fuels, such as Jet A, which it then had to upgrade to meet the MilSpec.

Fuel Costs

As refiners moved away from JP fuel production, market competition became increasingly limited. The reduction in competition, in turn, allowed JP-8 suppliers to set higher prices, resulting in increased costs for the Air Force. In 2005, DLA

Energy purchased about $4.9 billion worth of JP fuels, which was some $1.4 billion more than in the previous year. In 2006, USAF spent approximately $6.6 billion on aviation fuel, about $1.6 billion more than it had budgeted for that year. By 2010, the Air Force was spending $7.2 billion for its jet fuel.

Approach

To address the problems of tightening Mil-Spec jet fuel availability and rising costs, the Air Force and DLA Energy began exploring a variety of options, such as fuel hedging, multiyear contracting, and use of alternate fuels, in particular, commercial jet fuel. They determined that the most cost-effective solution would be to convert to commercial fuel. The most commonly used fuels for commercial aviation are Jet A and Jet A-1, which are produced to the same ASTM International standard. Jet A is the primary commercial fuel used within CONUS, while Jet A-1 is the primary commercial fuel used in most OCONUS locations.

Jet A is similar to JP-8. The two fuels have the same energy content, density range, and flash point. The main differences are their freezing points (–47° C for JP-8 and –40° C for Jet A) and the inclusion of the three additives in JP-8:

- FSII, which (1) lowers the freezing point of water found in fuel, preventing possible formation of ice in the fuel; and (2) inhibits the growth of microbes (bacteria, yeasts, molds), precluding plugging of fuel filters by solids formed by microbial growth and the generation of acidic byproducts that can accelerate metal corrosion
- CL/LI, which (1) protects against corrosion of distribution systems (which may contain aluminum, steel, and other metals, as well as sealants, coatings, and elastomers), preventing leakage of fuel tanks and pipelines, contamination of fuel with particulates, and blockage of filters and screens from corrosion material; and (2) enhances lubricity, improving the performance of aircraft fuel systems, certain aircraft fuel control components, and ground distribution systems such as injection pumps on ground vehicles
- SDA, which dissipates static electricity generated during the movement of fuel and prevents sparking, reducing the hazard of charge accumulation in fuel-handling situations.

ASTM's Jet A standard categorizes these same three additives as optional. When combined with the three additives, Jet A performs essentially the same as JP-8. The NATO standardization code F-24 has been assigned to commercial Jet A with the same additive package as JP-8 for approved use in partnering nations' military aircraft.

Jet A-1 is similar to Jet A but has a lower freezing point (–47° C), which is the same as JP-8's freezing point. The main difference between Jet A-1 and JP-8 is that its specification does not mandate the inclusion of FSII, CL/LI, and SDA.

The only other jet fuel used in civilian turbine-engine powered aviation is Jet B. Because of its low freezing point (–60º C), Jet B is used in limited quantities by the USAF and Canadian commercial

aircraft when enhanced cold-weather performance is required. The specification for Jet B does not require corrosion or icing inhibitors. Jet B has been largely phased out.

Table 2 lists the commercial jet fuels currently available in the United States and NATO nations and summarizes their key characteristics.

Because of the similarities of the MilSpec and commercial jet fuels, the Air Force and DLA Energy decided to eliminate the use of JP-8 at CONUS military installations, replacing it with Jet A fuel, with the MilSpec additives are injected while the fuel is in the logistics pipeline. Injection is primarily performed by bulk storage contractors or at the DFSP. When the decision was made, commercial aircraft had already been routinely receiving JP-8 fuel at military bases, and military aircraft had been receiving Jet A at commercial airports. Furthermore, most USAF aircraft were already certified to use Jet A fuel, and there appeared to be no substantial barriers for the wider use of Jet A.

The Air Force and DLA recognized that converting to Jet A would give DLA access to a larger pool of suppliers, with the resultant robust competitive sourcing and lower fuel prices. In addition, because of the fungible nature of cross-country pipelines, the infrastructure required to segregate JP-8 could be eliminated, cutting the costs of the associated maintenance and sustainment processes and precluding the need for funding future sustainment and modernization projects. In short, the conversion would reduce the price of fuel at the point of use and simplify logistics, allowing efficiencies in fuel transportation and storage and leading to transportation cost savings.

Table 2. Commercial Jet Fuels

Fuel	Specification	Type	Freezing point	Flash point	Comments
Jet A	ASTM D1655	Kerosene	–40° C	38° C	Has been used in the United States for civil aviation since the 1950s. Is normally available only in the United States and at a few Canadian airports (Toronto, Vancouver).
Jet A (F-24)	NATO AFLP–3747	Kerosene	–40° C	38° C	Commercial Jet A with the additives required for JP-8: FSII, CL/LI, and SDA.
Jet A-1	ASTM D1655	Kerosene	–47° C	38° C	Is used in civil aviation outside the United States. Has a lower freezing point than Jet A, making it more suitable for long international flights, especially on polar routes.
Jet B	ASTM D6615	Wide cut (30% kerosene/ 70% gasoline)	–60° C	–18° C	Is rarely used except in operations requiring enhanced cold-weather performance. Is more dangerous to handle because of the high percentage of gasoline. Has been largely phased out.

Before a switch from JP-8 to Jet A could occur, two DoD petroleum agencies—AFPET and DLA Energy—needed to be in agreement. Otherwise, the Air Force and other military branches could not adopt commercial jet fuel usage for military applications. AFPET was responsible for determining the feasibility of using particular jet fuels, while DLA was responsible for jet fuel purchasing agreements between the government and commercial fuel refineries.

The following subsections describe key activities—some sequential, some concurrent—required to convert from JP-8 to Jet A with additives.

Establish Communication Lines

The Jet A team recognized early that the success of the conversion would be facilitated by establishing open communication lines and ensuring 100 percent transparency among DLA, the service control points, and the individual military services. The Jet A Conversion Working Group (JACWG) served as the official communications link. Throughout the conversion process, the group was key to resolving operational constraints, documenting agreements, and establishing a symbiotic relationship that mutually benefited DoD and the fuel suppliers.

DLA-led working groups coordinated the complex, comprehensive effort. Senior leaders supported the working groups, providing vision and making the tough decisions required to keep the Jet A conversion program moving.

Hard work and extensive open communication among all parties went into making the initiative successful. Education was a key element of the Jet A program, as was positive change management. Open communication about inventories, weapon systems, local fuel availability, procurement cycles, and many other topics enabled the wholesale conversion of DoD's "single fuel on the battlefield" to the satisfaction of all involved parties.

Analyze Technical Feasibility and Cost Avoidance

In accordance with "Air Force Smart Operations for the 21st Century" (AFSO21) and LEAN concepts, USAF and DLA began to examine the technical feasibility and opportunity for cost avoidance of a conversion from JP-8 to Jet A (F-24). The technical feasibility analysis examined the chemical compositions of JP-8 and Jet A (F-24) and the possible negative effect of a conversion on military aircraft and equipment that use, store, or transport the fuel. The analysis found no technical barriers to a complete conversion. In similar analyses, the Navy determined that the majority of Navy and Marine Corps aircraft could use Jet A without having a negative effect on CONUS-initiated operations.

The Jet A team also conducted research to determine the need for various fuel additives and the potential impacts on flight profiles when using Jet A. The results of those technical evaluations supported conversion. In addition, the team completed operational, safety, suitability, and effectiveness (OSS&E) technical evaluations.

The opportunity for cost avoidance was considered through an analysis of military and commercial-grade jet fuel influenced by West Coast refinery prices. Because volume and demand drive market prices, a reduction of pennies or fractions

of pennies on a gallon can mean significant savings annually. An Air Force business case analysis, completed in May 2008, estimated that USAF would save about $40 million a year by converting to Jet A. This was primarily based on a reduction in the product cost due to more competition and to fewer handling costs. A 2011 cost-benefit analysis sponsored by DLA validated the savings; the DLA report recommended that the services convert to Jet A as soon as possible to take advantage of savings opportunities.

Test the Fuel

DLA, in concert with the Air Force Research Laboratory (AFRL), conducted extensive research to ensure that the use of Jet A (F-24) would not negatively affect the Air Force mission. AFRL tested the commercial fuel in virtually all DoD aviation and ground equipment. The testing demonstrated the viability of using Jet A (F-24). The research also found that, because they possess similar physical and chemical properties, Jet A (F-24) and JP-8 can be intermixed in the same tank at any ratio without any negative effects on equipment. Therefore, no special handling or procedures are required to use Jet A (F-24). A baseline study by DLA and AFRL showed that the use of Jet A (F-24) in aircraft depended not on technical considerations, but on logistics, cost, and policy considerations.

Another key research project dealt with the differences in the fuel freezing points of JP-8 and Jet A. Through testing in B-52s, B-1s, F-15s, and KC-135s, AFRL determined that the 7-degree difference in fuel freezing points (–47° C for JP-8 and –40° C for Jet A) would have little operational impact.

Conduct Demonstrations

In November 2009, AFPET and DLA began demonstrations at four Air Force bases: Dover (Delaware), Little Rock (Arkansas), McChord (Washington), and Minneapolis-St. Paul Air Reserve Station (Minnesota). The demonstrations focused on three factors:

- ***Flexibility***. The demonstration of flexibility was basically a logistics demonstration of moving from JP-8 to F-24 in CONUS. By the end of 2011, when USAF expanded to nine locations issuing Jet A (F-24), more than 255 million gallons of Jet A had been purchased from Air Force locations and another 234 million gallons had been purchased from commercial airports. Over that 2-year period, no known operational or maintenance impacts occurred. In addition, two Air Force locations operating on commercial airports had been using Jet A with additives since 1995, again without impact.

- ***Marking of equipment***. The conversion from JP-8 to Jet A (F-24) began by relabeling the fuel tanks, trucks, and equipment. The purpose was to ensure that all ground tactical equipment markings of JP fuel only could be easily identified by sight and that record jackets were annotated with the date Jet A (F-24) was first received.

- ***Introduction of additives***. The demonstrations showed the capability to inject fuel additives at different points in the supply chain. Because Jet A allows the same additives used in JP-8, DLA can capitalize on the latest additive injection technology to ensure that all airframes receive the full additive package. By buying a commercial fuel and injecting the additives later in the supply chain, DLA can procure the fuel at a cheaper price.

Because of the success of the demonstrations, the Air Force had expanded the use of commercial aviation fuel to an additional 14 CONUS bases by 2012. In addition, AFPET initiated a decision package to Air Force senior leadership recommending conversion of its remaining locations in CONUS. That, in turn, led to planning for full DoD-wide CONUS conversion.

Analyze and Upgrade the Supply Chain

Expert supply chain analysis was required to identify the optimum locations for injecting the three MilSpec-required additives—FSII, CL/LI, and SDA—while balancing the management of non-additive stock in order to receive the fungible benefits. The analysis determined that DLA could limit the number of injection systems required by strategically placing them at DFSPs. In other words, the analysis determined that the three additives should be injected or blended when the fuel is in the DLA logistics pipeline—after distillation by the supplier but before it arrives at operating bases. When the Jet A (F-24) arrives at an operating base, it should undergo routine quality control inspections to ensure it meets military requirements.

Through outstanding cooperative efforts, specific injection locations at DFSPs were quickly identified and agreed upon, taking into account the various impacts on the supply competition, so the necessary additive infrastructure upgrades at the DFSPs could begin.

Jet A team members led the acquisition of fuel freezing point analyzers and organized their placement at strategic locations in the supply chains. Those data enabled base fuel offices to provide the Tanker Airlift Control Center actual fuel freeze points vs. specification limit, if needed. The actual freeze point readings allow flight planners to develop specific operational flight windows. In addition, the data alleviate operational concerns about the difference in freezing points to various weapons system owners; their coordination reduced the time and effort required to update technical manuals. They coordinated the setup and removal of innovative additive injectors at no additional cost to the Air Force. Their efforts demonstrated that commercial technology would help DLA Energy and

DoD take advantage of strategic injection points.

Revise Documentation

All Air Force publications, documents, and manuals were updated to list Jet A (F-24) as the authorized fuel. Specifically, the documentation on aircraft was revised to list Jet A (F-24) as the primary fuel in CONUS, and the documentation on ground tactical equipment was revised to specify Jet A (F-24) and JP-5 as the primary fuel and diesel as the alternate fuel. In addition, NAVAIR 00-80T-109, "Aircraft Refueling NATOPS Manual, and MIL-HDBK-844," Department of Defense Handbook: "Aircraft Refueling Handbook for Navy/Marine Corps Aircraft," had to be revised.

The chief of the Technical Assistance Division provided technical guidance and direction as the quality operations were translated from MilSpec to commercial grade jet fuel. His overarching support led to the coordination and updating of MIL-STD-3004, "Quality Assurance/ Surveillance for Fuels Lubricants and Related Products," ensuring that fuel quality assurance procedures were transparent and interchangeable within the services.

Establish Procurement Vehicles

The Jet A team established basic ordering agreements (BOAs) for commercial jet fuel both domestically and overseas. BOAs streamline the procurement process and allow buyers to quickly meet additional commercial Jet A requirements that are not covered under long-term contracts.

Manage Site Conversions

The Jet A team finalized the USAF Headquarters Program Guidance Letter, signed by the Secretary of the Air Force and the Air Force Chief of Staff, providing authority and guidance to convert the CONUS Air Force locations to commercial jet fuel. The JACWG coordinated full CONUS conversion in conjunction with the other service control points.

Team members provided vital fuel inventory requirement and sales data, which were paramount to creating strategic conversion plans and conducting supply chain analyses. Their efforts in retrieving mass accounting and inventory information from multiple databases and DLA counterparts and consolidating it into usable decision-quality data assisted not only the Air Force, but the Army and Navy as well. Providing query responses in multiple formats proved instrumental to the JACWG's planning and execution efforts, ultimately allowing DLA to move forward with contracting actions.

Jet A team members managed individual site conversions from JP-8 to Jet A (F-24). Among other things, they briefed each installation's leadership on the conversion process, established inventory stock requirements, coordinated travel, staffed official correspondence, provided media packages, and provided data for analysis.

Team members coordinated the collection and dissemination of several key foundational research reports instrumental in obtaining approval from the Air Force weapon system program offices for the use of Jet A (F-24) through the Air Force Materiel Command's OSS&E process.

Coordinate with Stakeholders

Crucial to the successful conversion from JP-8 to Jet A (F-24) was meticulous coordination with various stakeholders:

- ***Other U.S. government agencies.*** The team coordinated with the U.S. Environmental Protection Agency to update DoD's National Security Exemption for use of jet fuel in tactical deployable vehicles and equipment. The team also coordinated with state and local agencies to ensure that all environmental permits were updated to accurately capture the product change.
- ***NATO partners.*** The team coordinated with NATO partners, including those that are CONUS tenants, to ensure that they were able to accept the conversion and promulgate necessary standardization agreements and regulations. Translation of the Jet A program's intent to NATO partners was also key to the continued success of joint exercise and tenant programs. The team was critical in communicating the CONUS conversion plan to our allies and was instrumental in obtaining agreement within NATO to establish F-24 as the NATO standardization code for commercial Jet A with additives. This agreement was essential to ensure that NATO would ratify the use of CONUS Jet A fuel for use in NATO country aircraft.
- ***Commercial forums.*** Team members served as experts on commercial forums such as ASTM and the Coordinating Research Council. Having a position on these forums was critical in ensuring recognition and representation of Air Force and DoD requirements with regard to moving to full-time use of a commercial jet fuel specification. The team's efforts provided focused and relevant data to leadership of all involved communities.
- ***Industrial base.*** The team made a concerted effort to market to and educate the pool of commercial jet fuel suppliers, which is considerably larger than the pool of suppliers of MilSpec jet fuel. Marketing to industry was essential to drum up as much interest as possible in supplying commercial Jet A to the military, and educating the industrial base was crucial to guide the commercial suppliers through the government procurement process.

Outcome

DLA completed the conversion of its CONUS aviation and ground fuel procurement, storage, and installation infrastructure in October 2014, well ahead of the scheduled 2017 date. The conversion involved 266 locations. Wright-Patterson Air Force Base (AFB), in Ohio, was the last base to be con-

verted, marking the beginning of a new era of improvements in fiscal responsibility and supply chain efficiency. Completion ahead of schedule was a result of professionalism, communication, work ethic, and cohesiveness.

The Jet A team's efforts ensured that leadership and DoD as well as internal partners, saw the merits and tangible benefits of converting to commercial-grade product. Conversion to a fungible commercial jet fuel removed the necessity for additional infrastructure and eliminated the cost of repair and sustainment from some facilities, saving millions of dollars. DLA can now meet DoD peace and wartime requirements without supplemental solicitations.

The conversion was part of DoD's efforts to maximize the use of commercial fuels. By moving toward greater use of commercial fuels, DoD was able to take advantage of more competition and lower handling costs, which meant a reduced price for jet fuel. The conversion was about taking advantage of supply chain efficiencies and operational flexibility to create greater energy savings and security.

The conversion is good news for the customers and industry. Using commercial infrastructure, combined with the potential inventory savings from shortened procurement lead-times, means continued positive results for both DoD and industry. The conversion allows the Air Force and DoD as a whole to take advantage of a much larger commercial fuel supply chain. DoD is realizing savings by implementing a more efficient and effective global supply support network for storage and distribution.

Cost Savings

Key drivers for the switch were the military's need to reduce fuel costs and to increase operational efficiency. Because refiners no longer have to make JP-8, they have more leeway to maximize commercial-grade output. More refiners will bid on military business, increasing DLA's array of suppliers. Increased competition should lower prices. Logistics infrastructure, such as tankage, will be freed up for other uses. The whole jet fuel market becomes more efficient without the obligation to make military-grade supplies. The much larger commercial fuel supply chain gives DoD more operational flexibility and increases procurement competition to reduce fuel costs.

The conversion delivered a 2-cent-per-gallon initial cost savings. DoD spent $6.95 billion on JP-8 in 2013. The 2-cent spread would have saved the military more than $37 million if all JP-8 bought in 2013 had been F-24. The Air Force, which purchases more than 1 billion gallons of fuel annually within CONUS, will save an estimated $25.5 million in annual fuel costs because of the conversion.

Wider Supplier Base

The conversion allows for fuel purchases from a much wider pool of suppliers. The expansion of the industrial base resulted in lower overall aviation fuel costs for military customers. The whole jet fuel market became more efficient without the obligation to make military-grade supplies.

More Efficient Infrastructure

Price reductions were possible because the fuel production ratio is driven by demand. Increased Jet A fuel usage allows for greater use of commercial pipelines, thus making it easier to resupply DLA bulk fuel terminals and reducing transportation and inventory storage costs. In addition, conversion will help eliminate excess infrastructure by, for example, eliminating the need for a specialty product supply chain and enabling the reduction/consolidation of bulk fuel terminals. In addition, conversion will foster energy security and create operational flexibility for DoD.

Shortened Supply Chain, Increased Agility, and Increased Competition

The transition increases the agility of DLA and the services in their efforts to meet warfighter requirements. DoD became more efficient by eliminating portions of the JP-8 supply chain, reducing the logistics footprint. Logistics simplification frees the Air Force from having to source its jet fuel from a limited number of Mil-Spec-compliant vendors and then ship it around the globe. The fuel can now be purchased from commercial sources located anywhere in the theater of operations. This will reduce overhead and transportation costs by using more of the commercial pipeline systems versus expensive ocean tankers and fuel barges and having more flexibility when faced with temporary aircraft relocations. More competition and lower handling costs equates to reduced prices. Competitive sourcing coupled with the removal of segregation and transportation restrictions not only secures a better price for jet fuel, but it goes a long way toward ensuring that the services' requirements are met.

Future Efforts

The long-term plan is a continued conversion to the use of readily procurable commercial jet fuel, Jet A or Jet A-1, blended with the military additive package at the most logistically effective place in the supply chain. This effort will ultimately secure the DoD Energy Strategy and create an agile operating environment in all theatres worldwide.

Lessons Learned

AFPET identified the following key lessons learned during the Jet A program:

- ***Have a single point of contact.*** One of the reasons for the success of the conversion was having a single point of contact at DLA to work with and resolve issues.
- ***Ensure the team has the right expertise.*** The members of the Jet A team included people with scientific, technical, protocol, operational, managerial, and international relations expertise, among other skills.

- ***Enlist equipment and weapon system owners.*** To ensure that all applicable material for DoD and partnering countries was properly addressed, the team collaborated with equipment and weapons system owners in the task of updating technical data and manuals.

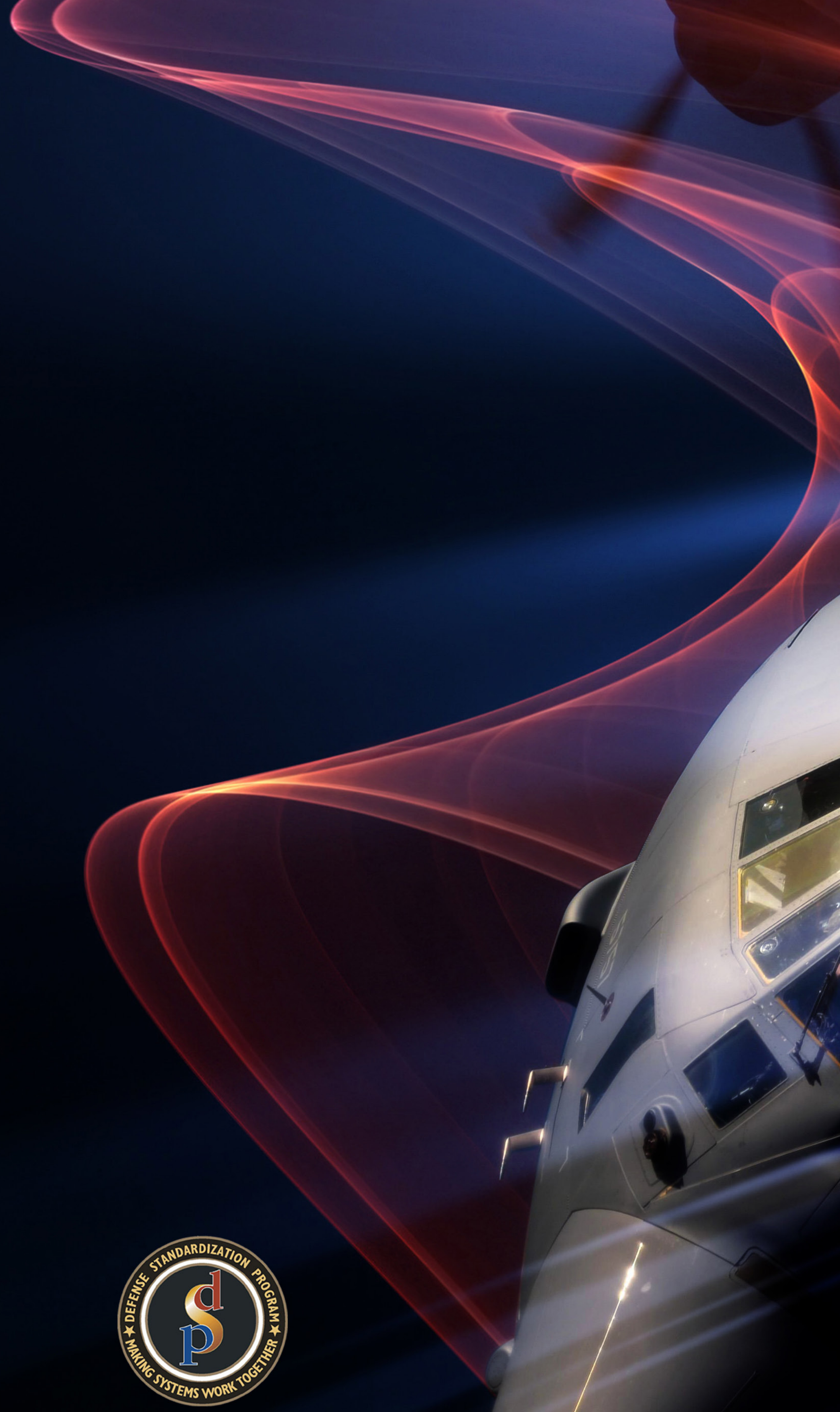
- ***Practice professionalism and communication.*** AFPET attributed the accelerated completion date of the conversion to the professionalism of and communication among all parties. Overall, the conversion acceleration was just a byproduct of the amazing group of logistics professionals' work ethic and cohesiveness.

- ***Emphasize education and open dialogue.*** Education and open dialogue were keys to the Jet A program's success. Sharing of key information, both research and decisional, was required to ensure that stakeholder concerns were addressed.

- ***Employ positive change management.*** Dealing positively with the necessary change management helped to ensure success.

- ***Practice outreach and marketing to industry.*** One of the keys to making the conversion a success was marketing the effort to industry to drum up as much interest as possible in supplying commercial Jet A. Identifying those suppliers and guiding them through the government procurement process was critical to the success of the initiative, giving DLA Energy a much wider pool of jet fuel suppliers, compared with the pool of Mil-Spec fuel suppliers.

- ***Translate program intent to international partners.*** Translation of the intent of the Jet A program to our NATO partners was key to the continued success of joint exercise and tenant programs.



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