Strong Demand Spurs Innovation and Efficiency in Aerospace Industry Supply Chains

Purolator
We deliver Canada

Introduction

Among the United States' and Canada's many shared interests, are the highly developed and hugely profitable aerospace manufacturing industries that contribute mightily to each country's economic success. The United States is the world leader in aerospace manufacturing, and Canada has the fifth-largest aerospace industry in terms of its gross domestic product contribution.

Aerospace manufacturing includes a range of goods, including defense supplies, general aviation aircraft, business jets, large civil aircraft, rotorcraft, aircraft parts, and commercial space sector-related products such as satellites and launch vehicles. These products contributed CAD $28 billion to Canada's 2013 GDP and more than US $325 billion to the 2013 U.S. GDP.

For both the U.S. and Canada, aerospace exports are a vibrant and important source of revenue. In the U.S., aerospace exports during 2013 totaled US $128.74 billion, an 8.6 percent increase from the year before. The aerospace industry posted a positive trade balance of US $70.5 billion in 2013, which was the largest trade surplus of any U.S. manufacturing industry.

In Canada, aerospace manufacturers export more than 80 percent of their products. During 2011, exports totaled more than CAD $16.4 billion, a figure that accounted for 73 percent of all industry revenue. And in a sign of how strong global demand is for high quality U.S. products—products that have passed strenuous Federal Aviation Administration standards—U.S. aerospace manufacturers export almost 65 percent of all production.

While global demand is strong for U.S. and Canadian aerospace products, the two countries remain top purchasers of each other's products. Fifty percent of aerospace products imported by Canadian businesses originate in the United States. Canada's Bombardier, for example, reports 53 percent of its U.S. commercial series jetliner will be sourced from U.S. suppliers.

Similarly, Canada is the leading supplier of aerospace products imported into the U.S, with Canadian businesses accounting for almost 60 percent of all imports. While the high quality of U.S. and Canadian products certainly is a factor in the high rate of cross-border sales, other considerations also have a role. For one thing,

the U.S. and Canada have in place significant trade incentives. The North American Free Trade Agreement (NAFTA), for example, eliminated virtually all tariffs on domestically manufactured goods moving between the two countries (as well as Mexico). And the U.S.-Canadian Bilateral Aviation Safety agreement helps streamline the regulatory process.

Other factors influencing the strong cross-border relationship include the two countries' cultural similarities—shared language (although Canada officially lists French and English as its official tongues), close proximity, economic similarities, shared alliances—in addition to the mature nature of each country's aerospace industry.

But with this tremendous opportunity and success, comes the inevitable supply chain challenges. The aerospace industry certainly does not operate in a vacuum and has been affected by numerous regulatory, economic, and industry developments that are affecting supply chain operations. Increased demand has the potential to create capacity issues. The industry currently faces a years-long backlog for planes, which will take several years to fulfill.

While this is certainly a nice problem to have, manufacturers may be faced with critical decisions with regard to inventory projections and logistics operations. Also important to note is the surge in demand has not been felt uniformly throughout the industry. Price-Waterhouse analysis found "the largest companies accounted for the bulk of the profit gains: All of the operating profit improvement was reported by companies in the top quartile. All other quartiles reported a decrease in operating profit, with the bottom half reporting a 14 percent drop."

The U.S. aerospace industry also finds itself in somewhat of a transition period, as one of the industry's principal sectors—the defense industry—has seen significant reductions in spending. According to the U.S. Commerce Department, defense-related manufacturing accounted for 41 percent of all aerospace production during 2009. By 2013, that figure had shrunk to 29 percent.

These changes come at an opportune time for the industry as innovations taking hold within supply chain management give manufacturers the chance to add efficiency and visibility to their production process. But not all manufacturers have

"But with this tremendous opportunity and success, comes the inevitable supply chain challenges. The aerospace industry certainly does not operate in a vacuum and has been affected by numerous regulatory, economic, and industry developments that are affecting supply chain operations."

done the homework necessary for incorporating vital upgrades or explained process changes to employees, suppliers, and partners.

The following discussion will offer insight with regard to some of the more pressing challenges facing today's U.S. and Canadian aerospace manufacturers. Also included is discussion about how qualified logistics providers are stepping up to help manufacturers understand the tremendous opportunities available for greater efficiency in all aspects of their supply chains.

Changes Afoot in U.S/Canada Aerospace Industries

The good news for the global aerospace market has been a pattern of strong, sustained growth in the years since the financial crisis, particularly for commercial airline manufacturers. In fact, growth has been so strong that the industry now faces a record backlog for order fulfillment—a backlog measured in increments of years.

Industry-leader Boeing, for example, had an eight-year backlog at the end of 2013 valued at $374 billion. The delay is even greater at Airbus, with a backlog value of $809 billion. According to analysis from ScotiaBank, orders generated from the Dubai and Paris air shows have further exacerbated the backlog and has prompted both companies to look to increase output.

SNAPSHOT OF COMMERCIAL AVIATION BACKLOG FACED BY BOEING AND AIRBUS

	12/31/13	12/31/12	12/31/11	12/31/10
Backlog (US $ billions)				
Boeing	$374	$319	$293	$256
Airbus*	$809	$638	$679	$480

*at list price

	Boeing	Airbus	Total
Aircraft backlog (units)			
Backlog at December 31, 2012	4,373	4,682	9,055
Net orders	1,355	1,503	2,858
Deliveries	648	626	1,274
Backlog at December 31, 2013	5,080	5,559	10,639

Source: Price-Waterhouse, 2014

In mid-2014, the Conference Board of Canada was reporting a three-year backlog for that country's manufacturers, with a value in excess of CAD $49.2 billion, a CAD $10 billion increase from just a year earlier.

According to analysis by Deloitte, this surge in activity is being driven by ambitious plans by many airlines to replace outdated aircraft with the "next generation" of fuel-efficient aircraft. Another factor is the growing demand for service among passengers, especially in the Middle East and Asia Pacific regions.

As impressive as these gains may be, it is important to note that success was not felt equally among all aerospace sectors. Business aircraft manufacturers, for example, are still feeling the effects of corporate and private individuals' reluctance to invest in private aircraft.

Also important to note, the U.S. and Canadian aerospace industries are dominated by a few large manufacturers. In Canada, the top 19 companies account for 87 percent of the country's production, with hundreds of smaller companies also competing for market share. Top Canadian companies include Bombardier (aircraft), Pratt and Whitney Canada (engines), CAE (flight simulations), Magellan (aerostructures), Vector Aerospace (MRO), Heroux-Devtek (landing gears), Bell Helicopter Textron (helicopters), Northstar (components), and Avcorp Industries (aircraft design and fabrication).

In the U.S., the industry is much more expansive, given its leading position in the world market and its strong relationship with global defense. Top U.S. aerospace companies include Boeing, Lockheed Martin, General Dynamics, United Technologies, Northrop Grumman, Raytheon, GE Aviation, L3 Communications, Honeywell, and Textron. For the nine months ending September 2013, the top 20 U.S. aerospace companies had revenues of US $266 billion.

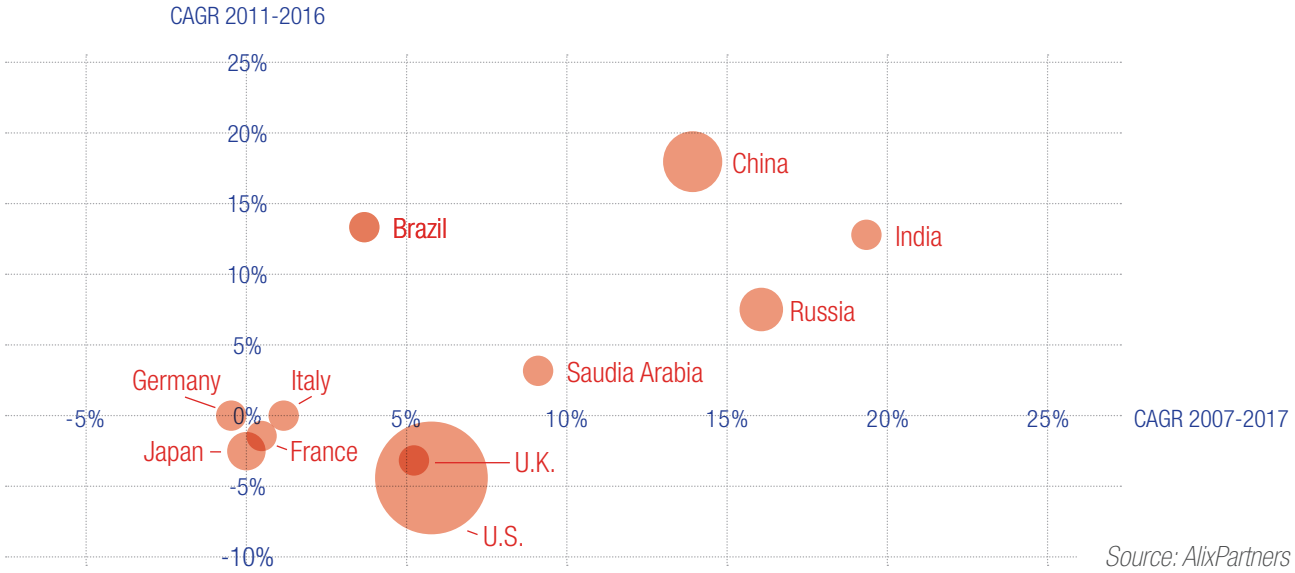
TOP U.S. AND CANADIAN AEROSPACE MANUFACTURERS

Canada	United States
Bombardier	Boeing
Pratt and Whitney Canada	Lockheed Martin
CAE	General Dynamics
Magellan	United Technologies
Vector Aerospace	Northrop Grumman
Heroux-Devtek	Raytheon
Bell Helicopter Textron	GE Aviation
Northstar	L3 Communications
Avcorp Industries	Honeywell

The current record-setting pace of growth in the commercial aircraft sector comes at a time of deep reductions within the defense sector. According to research by AlixPartners, global defense spending decreased in 2012, for the first time since 1998, to US $1.7 trillion. The United States, the largest defense market that accounts for nearly 40 percent of total global spending, reduced expenditures by 5.8 percent. This reduction was the result of a cessation in military activity in Iraq and Afghanistan, along with spending cuts mandated by the U.S. Congress. While the surge in commercial spending has been strong enough to offset the drop in defense spending, the impact has reverberated throughout the industry

This seeming "tale of two industries"—record growth in the commercial aviation sector and deep cuts in the defense sector—is impacting traditional supply chain operations. Not surprisingly, defense manufacturers face increased pressure to remain profitable in a declining market. Deloitte predicts an increase in research and development, as companies try to expand their portfolios, along with outreach to foreign

GROWTH IN DEFENSE SPENDING CHART



Source: AlixPartners

governments that have increased defense spending. Companies will continue to wring efficiencies from their existing supply chains by adopting lean manufacturing techniques, eliminating waste, and turning to technology wherever possible. Boeing, for example, received significant attention when it announced billions of dollars in reduced supply chain costs, most notably through a "Partnering for Success" plan, whereby suppliers were required to renegotiate pricing contracts.

At the same time, U.S. and Canadian manufacturers are under pressure to keep pace with global demand for commercial aircraft, components, and parts. Deloitte notes that many manufacturers are meeting this challenge by, among other things, investing in manufacturing processes and increasing the number of suppliers in their supply chains. Current conditions have also been ripe for significant consolidation within the industry as many smaller companies have been unable to make the necessary investments to meet the rapidly changing manufacturing requirements of today's advanced aircraft systems.

A recent Inbound Logistics article summed up the current conundrum this way: "Aircraft manufacturers are challenged to make lighter aircraft with lower fuel consumption, using materials sourced from a geographically diverse supplier base. Technical challenges are also delaying some production timetables, causing a ripple effect through a carefully planned schedule of costly incoming parts timed to keep inventories low."

To meet the challenges of this new reality, manufacturers are increasingly turning to their logistics partners to manage their complicated supply chains. This is a dramatic departure for many manufacturers, which have historically preferred in-house management as a way to protect intellectual property. But the unprecedented complexity of supplier networks, the need for precision processing, and the volume of component parts crossing international borders has resulted in a growing number of manufacturers relying on logistics providers as key partners and allies.

But choosing the right logistics partner is among the most important decisions an aerospace manager will make. Overseeing an aerospace supply chain requires a highly specialized skill set that, quite frankly, most logistics providers do not have. Most aerospace supply chains rely on a variety of intermodal options, and a logistics provider must have the resources to seamlessly enlist the right transportation solution at the right time. The sheer size of some parts will require specialized service, while other parts are parcel-sized and can travel through "normal" channels. Inherently tight production and delivery time frames demand flexibility and high degrees of visibility. And perhaps most important, aerospace manufacturers must have complete trust in their logistics partner—trust that they can perform as promised—and confidence that they will bring value to their operation.

"To meet the challenges of this new reality, manufacturers are increasingly turning to their logistics partners to manage their complicated supply chains. This is a dramatic departure for many manufacturers, which have historically preferred in-house management as a way to protect intellectual property."

Aerospace—Supply Chain Pressures and Solutions

Boeing made headlines in recent years, but not for the reasons it would have preferred. Even before the much-publicized 2013 battery-related issues that forced the grounding of its 787 Dreamliner, the jet experienced a myriad of supply chain challenges that resulted in significant cost overruns and delays. As reported by UCLA's Anderson School of Management, in an effort to reduce costs, Boeing relied heavily on a network of outside suppliers to provide several key components including wings and fuselage parts. But, as the project developed, Tier-1 suppliers were increasingly outsourcing to Tier-2 suppliers, who in turn were outsourcing to Tier-3 suppliers. "This multi-tier supply chain with at least 500 suppliers located in over 10 countries created major problems for Boeing," UCLA's analysis noted. Those problems included a 3.5-year delay and budget overruns that exceeded $10 billion.

While the Dreamliner's misfortune was certainly the exception it does illustrate the supply chain challenges that have become all too common within the aerospace industry, as manufacturers try to revamp best practices to meet the enviable problems associated with high demand. For an industry that relies on tight networks of interlocking tiered suppliers, this is no easy task. Following is a brief overview of some of the pressures on today's aerospace supply chains along with suggestions for meeting those challenges head-on and improving efficiency and value along the way.

Extended Supply Chains—Need for Visibility

As the Boeing Dreamliner example makes clear, it is vitally important for a business to have 360-degree insight and awareness of all processes and partners to ensure synchronization, understanding among all stakeholders, and maximum efficiency. Shared information, of course, is the key to a highly visible supply chain. For many aerospace manufacturers though the thought of sharing data with external partners goes against a long-ingrained culture of strict confidentiality. But as businesses understand the need for visibility across their extended supply chains—2014 research by Forbes/KPMG found 40 percent of senior executives say their supply chains lack visibility—businesses are realizing the value in data sharing with business partners.

40%

OF MANUFACTURERS

LACK VISIBILITY ACROSS THE EXTENDED SUPPLY CHAIN

Source: KPMG 2014

The Forbes/KPMG report also found that manufacturers willing to share real-time data with suppliers benefited from measurable results, including significantly reduced working capital, leaner inventories, and lower exposure to risk. "Those that are not able to harness their data in this way will be at a major competitive disadvantage," said KPMG's Mark Toon.

The results of heightened visibility can be significant. An October 2014 report in Airline Fleet Management cited a leading manufacturer of aerostructures that was able to achieve $2 million in inventory savings, 25 percent shorter production times, 30 percent lower assembly inventory levels, and a 40 percent reduction in overtime expenses.

There is such a thing though as having too much data, which can be counterproductive. Instead of searching for ways to tap into more and more information, some argue that maybe time would be better spent analyzing existing data.

Guy Courtin, director of industry solutions at Supply Chain for Progress Software, took on the issue in a recent publication of EyeForTranport.com. Noting that "visibility" has become the term du jour among supply chain managers, Courtin wonders if, rather than "seeing" or "possessing" more data, supply chain managers might find it more helpful to focus on "what it is we are already observing and how it impacts our supply chain."

He uses as an example a retailer who wants more POS data. "What if they could collect greater detailed information about how their stores are doing, what units are selling and at what volume and mix. If they could get more visibility down to the SKU level…how fantastic," he writes.

"But," he adds, "what if that data is too old once they received it? Have you really gained more 'visibility' or just more noise, information that might have once been valuable but now is lost due to a host of factors?" Instead he posits, "Supply chains need to focus on the data they are already viewing, understand what they are observing, and determine if there are any causalities that can be identified."

Jace Davis of IBM Sterling Supply Chain Visibility seems to echo that point by arguing that businesses need to focus on "quality" of data rather than quantity. "The better data you have, the better decisions you can make."

He also warns "today's complex supply chains create too much data for manual processes to absorb. This causes a lack of real-time visibility into supply chain events as well as an inability to detect and resolve exceptions in a timely manner."

So it would seem that an aerospace manufacturer looking to build greater visibility into its supply chains should think carefully about the volume and categories of data it needs to capture. It may well be that "less is more" when it comes to meeting visibility needs.

Inventory Management

Record-level backlogs for new production, along with strong demand for aftermarket parts to keep existing planes flying, are forcing a change in thinking with regard to inventory management. While having too much inventory in the pipeline is to be avoided, so too is the risk of a part shortage. Striking the right balance is the goal of every supply chain manager, and fortunately, technology-dependent forecasting tools are helping businesses to better manage their inventory projections.

DEMAND MANAGEMENT

In its simplest form, demand management refers to the process whereby businesses utilize various indicators to forecast customer demand and align their supply chains to meet those projections. To do this properly, a business must take into account a number of coinciding processes, including sales and operations planning, demand planning, statistical forecasting, sales plan reconciliation, and key performance indicator monitoring. Together, these processes can help a business develop a realistic demand forecast, which in turn will drive operations, manufacturing, sales, and marketing planning. When properly put in place, demand management gives everyone a seat at the table and a high degree of visibility into a business's forecasting processes.

Demand management can be a highly effective technology-driven tool for helping businesses manage inventory. Central to its success is the synchronization and integration of many different parts, with technology being the glue that holds everything together. The typical business has access to troves of data about virtually all aspects of its business. Big data can be truly overwhelming unless a business has the mechanisms in place to properly manage and assess the information.

Equally important, managing demand must be done in real time, and current technology makes this possible. In a recent white paper on this subject, IBM analysts note: "demand management is a more proactive approach than its predecessors—relying on highly sophisticated quantitative and advanced modeling techniques to preset tolerance levels and pinpoint problem areas, monitor and adjust strategies dynamically, and achieve real-time visibility and synergy across all channels."

With big data certain to play an increasingly larger role in supply chain operations, it is essential for businesses to embrace its potential. By implementing technology and processes for data analysis, businesses can make better and more strategic decisions.

DEMAND SENSING

Demand sensing is a relatively new concept in inventory management that allows businesses to focus on near-term demand. Demand sensing takes the data-driven principles of demand management to a higher level by applying additional indicators and different mathematical equations. Whereas

demand management tends to rely on historical data, and makes assumptions based on previous years' practices, demand sensing relies on real-time supply chain practices and tries to predict future demand based on indicators including open orders and daily sales.

VENDOR-MANAGED INVENTORY

Although not a new concept, VMI has grown in popularity in recent years largely because it helps businesses avoid having to assume responsibility for inventory. Instead, inventory obligations shift to the supplier, who tracks inventory levels and restocks as needed. Inventory is held by the supplier on-site or at a nearby location. Key benefits to the business include access to inventory as needed and liability to pay only for what is needed.

VMI is a technology-driven partnership, with strong reliance on electronic data interchange (EDI). Key information about product sales is transmitted on a predetermined basis from the customer to the vendor. That information could include quantity sold (both in dollar value and in number of units), quantity on hand, and quantity on order. Additional VMI benefits include:

- Greater flexibility with capital—by investing in less inventory, a business will have additional funds to spend on other areas
- Improved fill rates, decreased stockouts
- Reduced administrative burden
- Reduced purchasing costs—since orders are generated via EDI data, retailers no longer need to generate time-consuming purchase orders
- Decreased rates of obsolete parts remaining in inventory
- Less on-site storage space demands

Jon Schreibfeder, inventory management expert, author, and president of Effective Inventory Management, Inc., says that a well-managed VMI has the potential to be a "win-win" for both the supplier and customer. But, he cautions, any VMI agreement must clearly delineate expectations, fee structures, and responsibilities.

To that point, research by Oracle noted the importance of a vendor having an understanding of the big picture in order for a VMI to succeed. "Unfortunately, many VMI programs fail because they simply transfer the transaction aspects (and costs) of placing replenishment orders from customer to vendor, without improving the vendor's understanding of demand," the report noted. "In fact, such VMI programs often degraded supply chain performance because vendors lack visibility to retailer-driven promotions and other store-level events. This visibility is needed to forecast accurately."

For a VMI arrangement to succeed, particularly in the highly technical, exacting confines of the aerospace industry, vendors need to be fully aware of all factors affecting market demand. Specifically, that visibility can allow vendors to properly anticipate inventory needs and, in turn, decrease operating costs.

NEED FOR FLEXIBILITY

As aerospace suppliers and manufacturers adapt to the new normal of increased demand, tight production schedules, and global outsourcing, the need for customized logistics plans and flexibility is essential. A supply chain must be able to accommodate all scenarios, from extremely urgent parts deliveries to longer lead times inherent to ocean travel.

"During the next few years, 20 new aircraft will be in circulation that are not built yet," one supply chain manager explained in an Inbound Logistics industry overview. "The parts to build those new planes are sourced from more than one dozen different countries, increasing lead time, complicating customs clearance, and challenging supply managers to match the right parts and order to the right modes and trade lanes in time to meet narrow delivery windows."

To accomplish this, a business will need flexibility to adjust processes as needed. For example, "We're seeing an increase in the number of urgent shipments for aircraft on ground (AOG)," Morten Jensen of France's Geodis global logistics provider told Inbound Logistics. "Because manufacturers are trying to reduce inventories and enable just-in-time delivery, the number of urgent shipments is up. That means service providers are required to offer round-the-clock staffing to address emergencies."

Any aerospace business operating within strictly defined supply chain protocols will not be able to keep pace. Today's realities of "just enough" inventory set to arrive at "just the right time" demand flexibility to meet varied and unpredictable manufacturing needs and customer expectations.

REVERSE LOGISTICS

The aerospace industry has very unique needs with regard to returned parts. Most governments impose strict recordkeeping requirements with regard to airline parts' movements. A manufacturer must be able to provide detailed reporting—down to the serial number—for many categories of parts. In addition, many parts have very time-definite life cycles, which require detailed monitoring and on-time replacement. This in turn means that, perhaps more so than most industries, it is vitally important for aerospace businesses to have in place highly efficient reverse logistics strategies.

A qualified logistics partner can help a business determine its precise needs and then build a strategy to ensure efficiency, compliance, and satisfaction. Just as no two outbound aerospace supply chains are the same, each business will also need a customized returns management solution.

RISK MANAGEMENT

Managers must also contend with the increased risk of disruption that comes with today's increasingly global aerospace supply chains. Although manufacturers would ideally reduce overall supplier numbers, the typical network still includes dozens of suppliers located around the world. And, as Inbound Logistics points out, "take into account

> "During the next few years, 20 new aircraft will be in circulation that are not built yet. The parts to build those new planes are sourced from more than one dozen different countries, increasing lead time, complicating customs clearance, and challenging supply managers to match the right parts and order to the right modes and trade lanes in time to meet narrow delivery windows."
>
> *Source: Inbound Logistics, January 2014*

additional tiers, and the total supply base can number in the thousands." How then to brace your supply chain for the inevitable disruption—be it a weather emergency, labor issue, infrastructure issue, political unrest, or any other unforeseen condition?

Enterprise-wide Risk Management (ERM)

This approach requires a business to identify all potential risks throughout its organization, and to then assess those risks in terms of likelihood, impact, response required, and monitoring progress. As LM notes, the ERM model provides a framework that consists of eight elements: internal environment, object setting, event identification, risk assessment, risk response plan, control activities, information communication, and monitoring. The enterprise-risk model allows businesses to proactively identify risks and have plans in place to manage those risks.

Scenario Planning Using Probabilistic Methods

Although the concept of integrating probability into risk-based planning has been around for at least 50 years, it is only now making its way into supply chain risk management. In its most basic form, this involves a business compiling a comprehensive overview of all potential risk—similar to the enterprise-wide risk management process described above—and then factoring in additional elements, including historical patterns and uncertainty of all external factors. After that, a business would develop "what if" scenarios as a way to predict the impact of those external factors on their business. This exercise allows businesses to better understand the impact of external factors on their businesses, to prioritize those risks, and to develop a corresponding response plan.

These strategies are intended to build upon a series of more traditional questions that a business must ask before undertaking a risk analysis:

- Do our primary suppliers meet key financial stability standards?
- Have we considered multiple source suppliers rather than relying on a single provider?
- Should we select suppliers located closer to our customers or to key manufacturing facilities?
- Do we have alternate suppliers identified in case of emergency?
- Do our alternative suppliers rely on the same transportation routes, power grids, or materials manufacturers as our primary suppliers?

Choosing the Right Logistics Provider

A common theme in each of the supply chain pressures discussed above is the need for an experienced hand at the helm to ensure that all processes are well managed and in sync, and that a supply chain is functioning with high levels of efficiency and accountability. That experienced hand most often comes in the guise of a logistics partner, and as most aerospace managers will attest, it is a critically important decision.

For one thing, most logistics partners simply do not have aerospace experience and expertise. That fact alone limits the number of qualified logistics providers from which to choose. Other factors must also be considered: How important is customs and border clearance expertise to your supply chain? How extensively will you need to rely on intermodal solutions? And what levels of delivery options are needed?

With so much at stake, an aerospace business must make the time to thoroughly investigate all options before deciding on a logistics partners. Among the key considerations are the following.

CUSTOMIZATION AND COLLABORATION

It's essential to view your logistics provider as a partner. You want to build a relationship so there is mutual understanding of your business objectives, priorities, and needs. This information sharing can only happen through many, many direct conversations and ongoing open lines of communication. A good logistics provider will use this information to create a customized solution to meet your specific needs.

PERSONALIZATION

As you build your relationship, it's important that the same individuals service your account the whole way through. The same individuals who prepare your original logistics solution should be the same people who oversee the every step of your manufacturing and distribution process, right down to final delivery mile of your shipments.

CUSTOMER SERVICE

Equally important is a high level of customer service. Services should include a dedicated customer service representative with whom you have a personal relationship and direct contact information. Your customer service representative should be fully aware of your business needs, provide you with regular updates, and know about—and resolve—any snafus or changes before they become problematic.

SCOPE OF SERVICE

Today's logistics providers are able to offer a range of service options that can be customized to fit a business's precise needs. If you find that a logistics provider is forcing you to adapt your needs to meet its capabilities, it's a good sign the carrier will not be able to meet the demand for flexibility so important

in the aerospace market.

DEPTH OF ASSETS

An essential component of an aerospace logistics plan is the capacity to move a shipment, at a moment's notice, to anyplace in the world. A qualified logistics provider will be able to lay out precisely how its network is configured and how it will respond to your request for service.

EXPERIENCE

There is no substitute for experience. An experienced provider will have an integral understanding of what's needed to guarantee a seamless and hassle-free delivery. Unless a provider has been through the process, and knows firsthand what to expect, any claims of "guaranteed service" should be met with skepticism.

BORDER CLEARANCE/CUSTOMS EXPERIENCE

Aerospace shipments are highly regulated and demand a high degree of experience in managing any international border crossing. Ensuring your logistics provider has the necessary expertise is essential. Many, many shipments have been waylaid at the border because of missing customs documentation, improperly completed paperwork, or failure to pay proper duties/fees. This is another area where experience is a major advantage.

TECHNOLOGY

Many logistics providers have their own customized technology solutions that allow a bird's-eye view into operations. Often these internal systems will integrate directly with a customer's own network, making it possible to generate reports, billing information, and shipping materials.

Export Regulation and Compliance

U.S. and Canadian aerospace products are in great demand globally as well as by each other. Sales of aerospace-related products between the U.S. and Canada totaled more than U.S. $12 billion during 2012 and have traditionally been a source of strong revenue for each country's economy.

Any product crossing the border is subject to a strenuous border clearance process, even more so in the highly regulated aerospace industry. In the United States, the Federal Aviation Administration (FAA) maintains the world's most stringent requirements for ensuring the airworthiness of all aircraft and parts. Aerospace products entering the United States must meet an array of FDA compliance requirements, in addition to the "normal" clearance procedure managed by Customs Border Protection (CBP). Similarly, aerospace products entering Canada must meet strict security and airworthiness requirements, in addition to voluminous documentation and procedural steps established by Canada Border Services Agency (CBSA).

Following is a brief overview of the process for cross-border transport of aerospace products into Canada.

EXPORTING AEROSPACE PRODUCTS FROM THE UNITED STATES

The U.S. aerospace industry is heavily regulated under U.S. export control laws, with strict oversight and protocols governing a product's eligibility for sale to a foreign country. Not only is the process complicated, but it is also subject to frequent revisions. The process for determining eligibility and complying with U.S. regulatory mandates was most recently overhauled in 2013 when the Obama Administration imposed additional requirements on aerospace export processes.

In general, two regulatory codes have jurisdiction over aerospace-related products: the *International Traffic in Arms Regulations (ITAR),* administered by the U.S. Department of State, and the *Export Administration Regulations (EAR)*, administered by the Department of Commerce. Together the regulations set strict standards for which products may not be exported and reporting requirements for products that are allowed to be sold to foreign countries.

Further, the regulatory codes determine which U.S. exports require a license from the Commerce Department's Bureau of Industry and Security. License requirements vary based on an item's technical characteristics, end use, and intended export destination. Understanding whether a product requires an export license is yet another step in the overall export process.

Most businesses delegate this process to a highly qualified customs broker or logistics provider with necessary experience in the aerospace industry. Understanding the rules for exporting, and the process for complying with those rules and maintaining accurate records and documentation, is a very time-consuming, confusing process. A qualified customs broker will understand exactly what needs to be done and will ensure full compliance.

EXPORTING TO CANADA

Because of the historically close relationship between the United States and Canada, the U.S. government grants certain "leniencies" for products sold to Canada. A Canadian ITAR Exemption, for example, allows U.S. suppliers to export certain less-restricted aerospace products without having to obtain a license. The U.S. Commerce Department calls this exemption a "great opportunity" for U.S. aerospace companies seeking to open their export opportunities. But it also notes that many businesses seem to be unaware of the Canadian exemption as it is underused. "This exemption was meant to save U.S. industry time and paperwork and ease the development of business relationships with the Canadian government and industry," the agency notes.

Similar to the listing of "controlled goods" maintained by the U.S. government through the ITAR and EAR regulations, Canada maintains its own Controlled Goods Program to "safeguard controlled goods and/or controlled technology within Canada." While many of the products on Canada's controlled goods list are identical to those restricted via the U.S. ITAR regulations, a U.S. business will need to take care to determine if a product is eligible for export to Canada.

Another fact to keep in mind is that because Canada exports 80 percent of its total aerospace production, it is very likely that U.S. goods sold to Canada will end up being re-exported to a third country. This could necessitate an additional layer of compliance protocols for U.S. aerospace companies, depending on which compliance processes may be triggered.

CBSA—ADDITIONAL IMPORT REQUIREMENTS

The above discussion on aerospace requirements is in addition to customs and security mandates enforced by U.S. Customs Border Protection and the Canada Border Services Agency.

Following is an abbreviated overview of regulations a U.S. aerospace business exporting to Canada may face.

Business Number

Any business importing or exporting goods to Canada must register with the Canada Revenue Agency and be issued a business number that must be used on all paperwork, which is used to track all customs-related documentation and payments.

Cargo Control Document (CCD)

Canada Border Services Agency (CBSA) requires that a cargo control document accompany each shipment. The CCD is also referred to as a manifest and contains an itemized list of the contents included in a shipment.

Commercial Invoice or Canada Customs Invoice

A commercial invoice is the primary document a buyer/importer uses to pay a vendor/exporter and generally contains information including description of the goods, direct shipment date, tariff treatment, country of origin, tariff classification,

value for duty, appropriate duty or tax rates, and calculation of duties owed.

Canada Customs Coding Form—B3

CBSA requires Form B3 as a way to account for goods, regardless of their value, for commercial use in Canada. This document captures a wide range of information about each shipment, including country of origin, tariff treatment, mode of transport, and tax liabilities.

NAFTA Certificate of Origin

Shipments eligible for preferential treatment as outlined by the North American Free Trade Agreement must be accompanied by a Certificate of Origin. This document includes detailed information about the contents of a shipment, including the origination of each component part. The Certificate or Origin is not required for non-NAFTA shipments or for shipments valued at less than US $1,000.

Import Permits

CBSA assists other government departments (OGDs) in administering entry requirements for products that fall within their areas of control. For aerospace products, as discussed previously, this would generally trigger controlled goods regulations. The U.S. Commercial Service advises that securing the necessary permits can be time consuming and that attending to potential OGD requirements should be "one of the first steps taken" in initiating the export process.

DUTIES AND FEES

Critically important to doing business in Canada is an understanding of that country's unique sales tax code. Sales taxes are collected at the federal and provincial levels of government, and a business must be careful to comply with all applicable levies. Please note that sales taxes are different from import duties.

- A federal Goods and Services Tax (GST) of five percent of value is assessed on just about all goods entering the country.
- Provincial sales taxes are levied at the province level and are collected locally.
- The provinces of Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland and Labrador, and Ontario have opted to "harmonize" their provincial sales tax with the general sales tax. This combined rate is called the "harmonized tax" and represents the sum of the five percent federal GST plus the appropriate provincial tax.

Depending on the items being shipped, goods may also be subject to excise taxes and other fees. Another important thing to understand about the Canadian tax code—it is subject to change and without much notice. Businesses are responsible for keeping abreast of all tax policy change and for ensuring that correct taxes are collected and paid.

EXPORTING TO CANADA—FACILITATING THE PROCESS

A logistics provider with Canadian expertise can ensure a hassle-free border crossing and also help minimize associated costs. Various programs and processes are available to minimize duty obligations but a shipper must know about these opportunities. The programs are not advertised or in any way proactively offered to a business. Instead, a business must either commit internal resources to tracking U.S./Canadian border programs or do what most businesses do and enlist the services of a qualified logistic expert.

Duty Drawback

U.S. businesses are entitled to a refund of up to 99 percent of import duties paid on products that are subsequently exported. The refund is officially called a "duty drawback," and the concept dates back to the earliest days of our country. The duty drawback process is administered by U.S. Customs and Border Protection, which considers the refund an "entitlement" rather than a "right." As a result, the drawback filing process is very complicated and highly exacting. So much so that most businesses do not bother to apply for refunds to which they are legally entitled. In fact, more than $2 billion in drawback funds go unclaimed each year.

Tariff Classification

Every product entering the United States must bear a 10-digit identifying code, as found in the Harmonized Tariff Schedule of the United States (HTS), which is maintained by the U.S. International Trade Commission. The HTS includes more than 17,000 different product classifications, and code assignments can vary based on slight product variations. Products that are misclassified run the risk of being assessed higher tariff rates than necessary or of missing out on trade benefit eligibility.

North American Free Trade Agreement (NAFTA)

A key NAFTA provision is the elimination of tariffs on virtually all originating goods traveling between the U.S, Canada, and Mexico. But determining whether or not a product fits within NAFTA's terms for "origination" can be tricky. Under NAFTA, origination is not restricted only to goods produced within the U.S., Canada, or Mexico. Instead, the agreement makes allowances for products to include percentages of non-NAFTA materials and still qualify for preferential benefits. To determine if a product is eligible for NAFTA benefits, it is necessary to consult NAFTA's rules of origin, which specify content requirements for all products. Once a product is determined to qualify for preferential treatment, a NAFTA Certificate of Origin must be completed.

Trusted Trade Programs

The United States, Canada, and Mexico administer programs that grant expedited clearance to qualified participants. To qualify, a logistics or transportation provider must apply and undergo a rigorous screening process. These programs include the U.S. Customs-Trade Partnership Against Terrorism (C-TPAT) program, Mexico's Alliance for Secure Commerce

NEEC, Canada's Partners in Protection (PIP), and the joint U.S./Canada program Free and Secure Trade (FAST).

C-TPAT participants enjoy another benefit, which is the ability to utilize CBP's "Auto and Aerospace Center of Excellence and Expertise." Located in Detroit, the Auto and Aerospace Center is part of a network of "Centers of Excellence" established in recent years by CBP to streamline the trade process through "one-stop processing." All aerospace experts are now based out of the Detroit office and serve as a single point of processing for aerospace shipments. It is also presumed that the designated aerospace center will provide more uniformity for all imports, to ensure consistency and a smoother clearance process.

Non-Resident Importer Program

This is a program administered by the Canada Border Services Agency that allows U.S. businesses to compete "on a level playing field" in the Canadian market. U.S. businesses can act as "importer of record," charge Canadian customers a landed cost at time of purchase, and enjoy a less onerous paperwork burden and clearance process.

Electronic Filing

Like most business transactions, the government has become increasingly computerized, with much of the regulatory process now able to be completed online. In fact, certain programs, including the Automated Export System (AES) must be complied with electronically—paper documentation was eliminated in 2008.

Logistics Partner Expertise

If your business does not have the internal capacity to hire a team of compliance experts, it's vital that you have that capability within your supply chain team, namely, your logistics partner. A qualified logistics provider will have staff in place who are continually apprised of changes in regulations that affect the aerospace industry and cannot only ensure that your shipments are in full compliance but can also take advantage of any benefits to which you may be entitled, ranging from tax treatment to favorable trade provisions.

Conclusion

"A good problem to have" is how one aerospace executive described the current years-long backlog the industry now faces. The backlog, which for industry leaders Boeing and Airbus totals more than 10,000 planes, represents a combined total of more than eight years of assembly work.

The industry's record pace has caused manufacturers to adjust production strategies and find ways to ramp up production. "We cannot continue at this level [of orders], but what we are doing is continuing to increase production," Airbus sales executive John Leahy told Bloomberg Businessweek. Manufacturers are turning to suppliers to increase the flow of parts, and this in turn has resulted in increasingly complex supply chains that can involve thousands of suppliers located across the globe.

Fortunately, this surge in production comes at a time when innovation is taking hold among aerospace supply chain managers and new tools are available to help manage the increasingly complex processes. Technology allows businesses to have complete visibility into not just the "big picture" but the "whole picture." Inventory decisions are now based on firm data analysis and solid projections, and logistics providers are increasingly able to offer customized, flexible solutions to meet a manufacturer's precise needs.

For U.S. and Canadian aerospace businesses, which will continue to lead the world in quality production and first-class research, the sky will be the limit for a business with a well-managed, forward-thinking supply chain. Integral to achieving that, of course, will be a world-class logistics partner that can help lead the way.

Purolator. We deliver Canada.

Purolator is the best-kept secret among leading U.S. companies who need reliable, efficient, and cost-effective shipping to Canada. We deliver unsurpassed Canadian expertise because of our Canadian roots, U.S. reach, and exclusive focus on cross-border shipping.

Every day, Purolator delivers more than 1,000,000 packages. With the largest dedicated air fleet and ground network, including hybrid vehicles, and more guaranteed delivery points in Canada than anyone else, we are part of the fifth largest postal organization in the world.

But size alone doesn't make Purolator different. We also understand that the needs of no two customers are the same. We can design the right mix of proprietary services that will make your shipments to Canada hassle free at every point in the supply chain.

For more information:

Purolator International
1.888.511.4811
wedelivercanada@purolator.com
www.purolatorinternational.com
http://blog.purolatorinternational.com

References

"2011 Report: The State of the Canadian Aerospace Industry," Aerospace Industries Association of Canada, accessed November 12, 2014.

"2013 Report: The State of the Canadian Aerospace Industry," Aerospace Industries Association of Canada, accessed November 12, 2014.

"2013-14 Edition: Aerospace Resource Guide—A Reference for U.S. Exporters," U.S. Commercial Service.

"2014 Global Aerospace and Defense Industry Outlook," Deloitte.

"A Demand-Driven Approach to Vendor Managed Inventory," Oracle, September 2006.

"Aerospace industry profits fell in half to $699 million in 2013: Conference Board," The Hamilton Spectator, June 18, 2014.

"Aerospace supply chain faces harsh reality of having to deliver huge backlog of orders following a boom in commercial orders in 2011," AlixPartners research, July 5, 2012.

Argo, Joel, "Benefits and Drawbacks of Demand Management versus Demand Sensing," Supply Chain Brain, November 13, 2013.

Bachman, Justin, "With Epic Backlogs at Boeing and Airbus, Can Business Be Too Good?" Bloomberg Businessweek, January 29, 2014.

Baldwin, MaryAnne, "Analyze this: The Benefit of Big Data," Airline Fleet Management, September-October 2014.

Bruno, Michael, "CEO McNerney Defends, Promotes Boeing Supply Chain Squeeze," Aviation Week, April 30, 2014.

Burnett, James, "The logistics of Export Control Reform for the aerospace industry," Thompson Coburn LLP, April 14, 2014.

"Canada: Aerospace," U.S. Commercial Service Fact Sheet, March 2011.

"Canada: Foreign Affairs, Trade and Development," Canada.ca, accessed November 12, 2014.

"Canada Urged to Bolster Aerospace Industry," CBC News/Politics, November 29, 2012.

"CBP Opens Auto and Aerospace Center of Excellence and Expertise," U.S. Customs and Border Protection press release, September 6, 2012.

Courtin, Guy, "Visibility. We all want more...but what do we really want?" Eye for Transport, August 15, 2012.

Davis, Jace, "Supply Chain Visibility—Smarter Commerce, the Perfect Order and You," IBM The Social Business Blog, 2012.

Ezell, Stephen, "2013 Aviation Summit Highlights Industry's Contributions to U.S. Economic Competitiveness," The Innovation Files, April 2, 2013.

Gomes, Carlos, Aerospace Industry Trends, ScotiaBank, April 15, 2014.

"Import Airworthiness Approval," Federal Aviation Administration, accessed November 16, 2014.

"Importing and Exporting Aircraft," Aircraft Owners and Pilots Association, accessed November 16, 2014.

"In a Complex Retail World, Kellogg Company Turns to Demand Sensing," Supply Chain Brain, August 6, 2012.

Laksham, Narayan, "Global Manufacturing Report Highlights Supply Chain Visibility Challenges," Ultriva Blog, June 23, 2014.

Linebaugh, Kate, "GE Brings Engine Work Back," The Wall Street Journal, February 6, 2013.

Murray, Martin, "Vendor Managed Inventory (VMI)," About.com.

Powley, Tanya and Parker, Andrew, "Aerospace groups voice concerns over supply chain," The Financial Times, August 31, 2014.

Peri, Richard, "Bilateral Agreements," DOM (Director of Maintenance) magazine, May 1, 2013.

Schlegel, Gregory, and Trent, Robert, "Risk Management: Welcome to the New Normal," Logistics Management, February 1, 2012.

Schriebfeder, Jon, "Vendor Managed Inventory," Effective Inventory Management, June 3, 2012.

"Tale of Two Cycles' in Aerospace & Defense According to Alix Partners Study," Alix Partners research, June 9, 2013.

Teng, Christopher, Yeh, Brian, and Zimmerman, Joshua, "Boeing's 787 Dreamliner: A Dream or a Nightmare?" The UCLA Anderson Global Supply Chain blog, May 15, 2013.

Terry, Lisa, "Aerospace Logistics: Building for Growth," Inbound Logistics, January 2014.

"The Aerospace Industry in the United States," SelectUSA, U.S. Department of Commerce, accessed November 13, 2014.

"Top Twenty U.S. Aerospace Export Markets," U.S. Department of Commerce, accessed November 16, 2014.

"U.S. Aerospace Exports to Canada and Export Controls," U.S. Department of Commerce presentation, January 25, 2014.