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Going global in Aerospace and Defense

**Aerospace and
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Going global in Aerospace and Defense

By Ralph Carpenter and Allan Henderson

Although global integration is an increasingly critical success factor for enterprises across sectors, the Aerospace and Defense (A&D) industry is less mature than others in this regard. The choice for A&D companies is either to delay taking action or to embrace the issue. We believe that companies that move now have the opportunity to strengthen their positions in the worldwide marketplace and optimize business results through more effective operations and better value propositions.

Introduction

Today's Aerospace and Defense industry is going through challenging times. Major airlines are struggling to be profitable, and new priorities are changing where national governments will spend their defense budgets. At the same time, A&D companies are working to change their business models, and offer more innovative products and services. Mergers and acquisitions pose a continuous threat – even as new players enter the industry and heighten competitive pressure.

Perhaps the most important change is the rapid globalization of the industry. It is no longer enough to be a regional success. Non-traditional markets in new areas of the

world are becoming increasingly important, as are production locations in these regions. For example, over the next 20 years, commercial aircraft deliveries are expected to shrink in Europe and North America but grow elsewhere.¹ And if defense spending continues along today's patterns, predictions see the biggest growth in China and India, with less spending in the United States and dramatic reductions in the UK, Germany and France.²

This means that business success will be increasingly dependent on how well a company can compete as a worldwide organization. For A&D companies, the challenge is to quickly transform into what we refer to as a "globally integrated enterprise."

Going global in Aerospace and Defense

A globally integrated enterprise operates as a unified whole – integrating production and delivering value through a seamless network of internal and external resources worldwide.

What is a globally integrated enterprise?

A globally integrated enterprise is a new kind of organization – a step beyond today’s “multi-national corporation.” It can locate operations and functions anywhere in the world based on the right cost, the right skills, and the right business environment. It integrates operations horizontally and globally – performing as a cohesive whole, not as a hub with outposts. It is a company focused on connecting and leveraging sources of production and creating value, regardless of the physical location or the organizational ownership of these resources. It involves close interaction across its ecosystem of internal and external stakeholders, including employees, customers, partners, government agencies and other third parties with a stake in a product or service.

Characteristically, a globally integrated enterprise:

- Partners with other companies in the supply chain that offer better efficiencies
- Achieves a larger global footprint – via alliances or consolidation with companies that are good strategic fits
- Integrates the entire ecosystem (both internally and externally) and discourages sub-optimized silos
- Specializes on what the company does best and outsources or partners for the rest
- Strives for innovation in the company’s business model, operations and products
- Develops its human resources by recruiting and developing employees on a global basis and cultivating leaders who can perform effectively on a global stage.³

FIGURE 1.
Global integration addresses several key issues for today’s aerospace and defense companies.

Key issue	Underlying cause	Characteristics of a globally integrated A&D company:
New growth markets	Growth is in new markets in new regions of the world	Moves into new markets in a way that integrates those markets into the company as a whole
Operations moving to new regions	Offsets drag operations to new markets in new regions	Leverages local skills and resources to build a local presence and address offset requirements
Operational effectiveness	More complex value chains operate globally, but still need to be highly effective	Sets up collaborative supply chains to the extent that security constraints permit; uses leading-edge technology to make them highly efficient
Workforce changes	An aging workforce is poised to retire; new workers may be in new regions; “Generation Y” workers may have a different attitude towards work	Leverages workforces in new regions; also collaborates across the company (and with partners). Utilizes common processes and tools to drive efficiencies and establish a common corporate language

Source: IBM Institute for Business Value analysis.

Our findings indicate that strong performance as a globally integrated enterprise directly links to stronger financial performance.

Our assessment of the A&D industry

How well do today's A&D companies fit the model of a globally integrated enterprise?

Our assessment indicates that leading A&D companies tend to be those that are already more globally integrated than their peers. We believe the long-term business winners will be those enterprises that continue along the path to becoming even more globally integrated.⁴

Using publicly available information, IBM assessed 26 A&D companies in terms of their maturity as "global integrated enterprises." While we looked at the A&D industry as a whole, we also observed the commercial and defense sides separately (although some companies fit in both segments). We based our assessment on four criteria:

1. *Serving global markets:* Revenue from local versus non-local markets, global clients, and global value proposition/differentiation/branding
2. *Scope of activities:* Global production sites, sourcing hubs, assets and collaboration (internally and externally)
3. *Value creation and capture:* Levels of efficiency in running production, supply chain, and operations; the degree of partnering and globalization for value chain components
4. *Sustained value-add:* Long-term profitability by leveraging new resources, technology, standardized business processes and innovation capabilities.

Our assessment results indicate that both the commercial and defense sides of the industry are in the middle of the maturity range, with commercial being slightly ahead (see Figure 2).

We also found that strong scores as a globally integrated enterprise correlate to stronger financial performance, as Figure 3 shows for the defense side of the industry. (The commercial side has a similar picture.)

FIGURE 2.

A&D commercial is only slightly ahead of A&D defense in global integration.

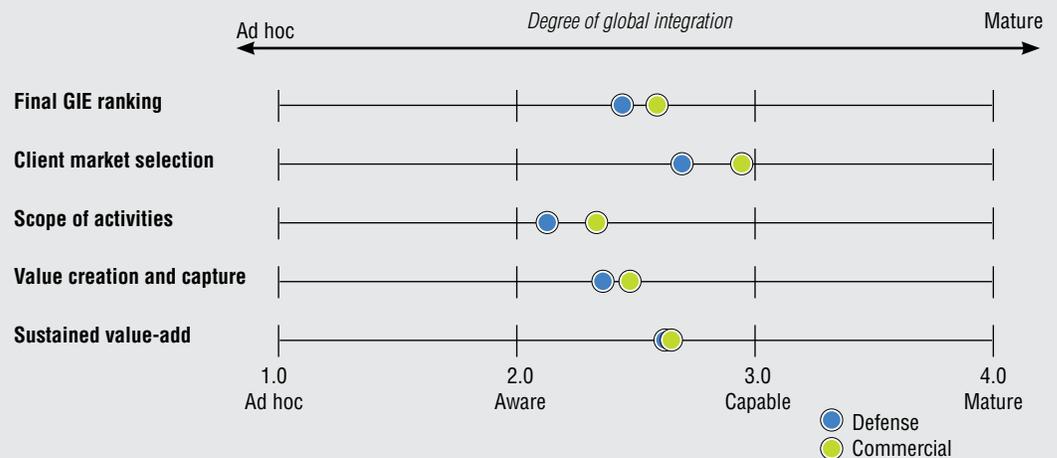
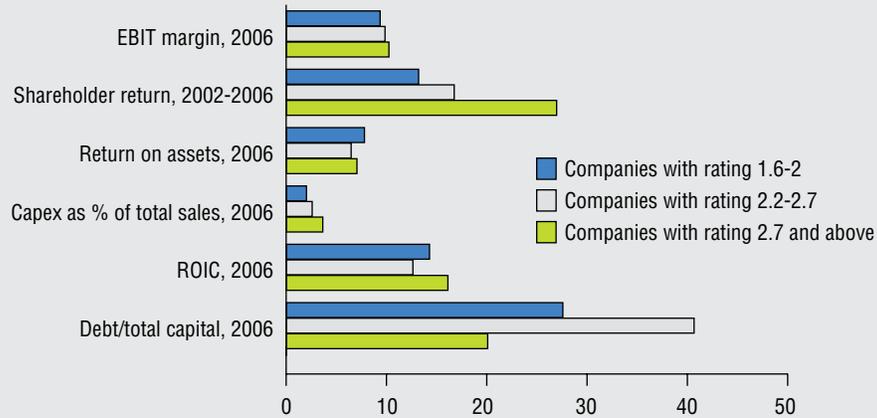


FIGURE 3.

High scores as a globally integrated enterprise can directly correlate with stronger financial performance.



Note: Based on analysis of 27 A&D companies.
Source: Thomson Financials and IBM analysis.

Collectively, companies scoring high in our assessment exhibited higher profits, greater earnings per share, compound annual growth rates, return on assets and less debt.⁵

We believe the globalization shift will continue for the A&D industry – requiring companies to operate, innovate and compete successfully as globally integrated enterprises.

A&D: The challenges of global integration

Enterprises across industries – including A&D companies – face common challenges in moving towards global integration, including:

- *Engineering collaboration* – Designing products, or parts of products collaboratively, with engineers from different parts of the world (and perhaps in different companies)
- *Operations collaboration* – Collaborating on manufacturing and delivery on a global basis, in a way that does not adversely affect coordination and cycle times

- *Logistics* – Coordinating the movement of goods through supply chains that span the globe
- *Infrastructure* – Having the IT resources and other infrastructure elements to support global engineering, global operations and global logistics. (This will typically include infrastructure components from partners and suppliers).
- *National regulations and taxes* – Satisfying regulations, laws and taxes imposed by individual nations
- *Culture* – Accommodating different languages, customers and practices in cultures around the world to meet business goals
- *Competitor companies* – Outperforming industry peers that are moving ahead with global integration.

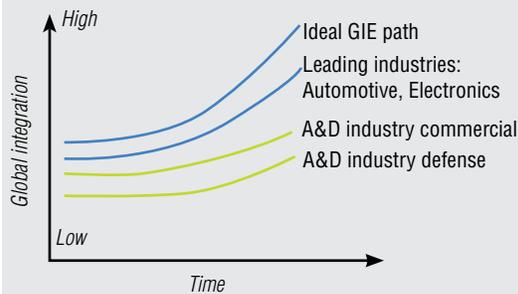
At the same time, the A&D industry is different from other sectors. Its defense side faces sometimes severe restrictions on crossing

Global integration requires adjustments at every level of an organization – from engineering and operations, to logistics, compliance, culture and competitive stance.

national borders. This suggests that the commercial side will most likely lead the defense side in terms of global integration maturity. However, the challenges on the defense side may also affect the commercial side, since many large A&D companies operate in both commercial and defense markets. Because of the industry's dynamics – especially restrictions on cross-border communications – the A&D journey to global integration may take longer than in other industries, such as Automotive and Electronics (see Figure 4).⁶

We believe that the path to success for an individual A&D company today is to quickly become more globally integrated than its direct A&D industry competitors, regardless of the state of other sectors. However, the risk remains that a new entrant that is more globally integrated could suddenly become a formidable competitor in the industry.

FIGURE 4.
For A&D companies, global integration will likely take longer than in other industries, such as Automotive and Electronics.



Source: IBM Institute for Business Value analysis.

The A&D industry has three major forces pushing it *towards* global integration: offsets, changes in the workforce and competitive pressure. At the same time, it also has a major force pushing *against* it: ITAR (International Traffic in Arms Regulations) and similar restrictions. Among the forces pushing towards and against global integration, offsets and ITAR are the most dramatic:

Offsets are a common business practice in the A&D industry – pushing production to new regions of the world. Offsets are contractual agreements that require the exporting company to buy goods and/or services from the importing country as a condition of defense-related imports. Offsets may also be required in the purchase of civilian aircraft. While they can entail any kind of investment in the target country – direct or indirect – today offsets more often involve establishing highly skilled manufacturing and engineering jobs. For example, India's offset policy requires that foreign defense contractors source components and systems from Indian vendors for at least 30 percent of the value of orders of more than US\$3 billion they receive from the Indian military. (Offsets can even be as much as 50 percent of the value of the order). Indian companies are expected to get offset orders from global military equipment makers of nearly US\$4 billion through 2011.⁷

ITAR regulations control the export and import of defense-related articles and services on the United States Munitions List. The goal is to advance national strategic objectives and U.S. foreign policy via the trade controls.

ITAR restrictions are significant because a major constraint on U.S. companies is also a major constraint on the industry as a whole: The United States is the world's largest A&D market and has the world's largest military budget.⁸ Six of the top nine global aerospace companies are based in the U.S.⁹ Other countries have established ITAR-like arms control restrictions, such as the Wassenaar Arrangement and the Australia Group.¹⁰

ITAR regulations restrict collaboration and communications that cross national borders, even within the same enterprise. ITAR constrains:

- Subcontracting or outsourcing engineering to a non-U.S. country
- Subcontracting or outsourcing manufacturing to a non-U.S. country
- Inter-company collaboration, where communications need to cross the U.S. border
- Using non-U.S. citizens' talent and skills, even within the United States.

Becoming more globally integrated

We believe that the choice for an individual A&D company today is either to delay addressing the globalization challenge, or to embrace it as a chance to transform the enterprise and optimize business results. The companies that act now have the opportunity to reap advantages that may be denied to those that wait, including:

- Attaining leadership positions in the increasingly global A&D industry

- Improving business performance by efficiently leveraging an integrated business on a global scale

The goal should be to evolve quickly to become a globally integrated enterprise – ideally achieving competency in three ways:

1. *Tapping the power of globalization* – Using existing global resources effectively, and seeking new clients and potential partners worldwide
2. *Leveraging individual competencies* – Forging a strategy that enables modular business operations and takes innovative approaches to truly collaborating with partners and suppliers
3. *Delivering more value* – Assessing where, when and by whom value is created, and employing innovation approaches that are both traditional and collaborative in nature.

An A&D company should move towards global integration in a way that supports its near- and long-term business strategies – keeping in mind that different organizations may move at different speeds to attain competency in each area. The long-term goal is to buy, sell and operate as a worldwide enterprise in all major regions, move work to the location with the right skills (whether within the company or with a partner), and offer product and service value that competitors find hard or impossible to duplicate. Although it might not be able to get there in one “leap”, an A&D company can take immediate, short-term actions that map to

Our assessment indicates that there is plenty of room for every A&D company to improve its global integration efforts.

the competencies cited earlier and move the organization towards global integration. These actions may include:

1. Buy product components from leading global suppliers; sell products outside the home market; support the aftermarket at the global point of use.
2. Move non-core processes (HR, Finance, Supply Chain, IT, Engineering) to shared service centers and/or global centers of excellence; outsource selected non-core processes.
3. Develop new product and/or service value propositions that differentiate your offerings from the competition.

Our assessment indicates that there is plenty of room for every A&D company to improve its global integration efforts.

Our research and studies of various industries suggest that a company can follow three general steps to become more globally integrated (see Figure 5).

FIGURE 5.
A company can follow three general steps to become more globally integrated.



Source: IBM Institute for Business Value analysis.

Step 1: Identify the important actions that map to the global integration strategy.

The goal here is to align global integration efforts with existing business strategies (short- and long-term) in a way that will have the most impact. To do this, a company can:

- Identify the elements of the company's business strategy.
- Map the competency areas (globalization, componentization, unique value) to that strategy and prioritize the actions that the company should be taking.

Step 2: Identify the company's business components that "fit" the plans for global integration.

On its journey to global enterprise integration, a company needs to know which parts of the business to change. A component business model (CBM) is a good framework for identifying the company's basic business components, as well as those that can provide differentiation.

A CBM typically lays out a company's major business components in the areas of business development, sales and service, distribution, production, equipment and plant management, and business administration. For each of those areas, a CBM can help identify key business components in the areas of planning, control and execution. An A&D company can use a CBM to identify core competencies, recognize opportunities for partnering or outsourcing of capabilities, or simply note business components or sets of components that need to change in order to implement the planned actions.

Step 3. Ask five questions about important business components in the company as each relates to a globally integrated enterprise.

By answering these questions, a company can develop a strategy for improving its global integration initiatives:

- Where should the business function be done?
- Who performs the function?
- What technology enablers are used?
- How well does the business function integrate?
- How innovative is it?

Now, we will examine these questions in more depth:

Where should the business function be done?

Can it be accomplished at a different geographic location where there are better, more available skills and resources? The benefits of sourcing functions in this way may lead to more effective operations, cost savings and a more rapid response to market demands – especially in emerging markets.

The goal here is to locate companywide functional components where the best skills and resources reside (not necessarily all at a headquarters location – or even within a single country). For example, a company could set up global procurement centers or establish a global sales resource system for optimizing sales resources. It could run distribution at

a global level or use global standardized marketing programs. The company could also access some headquarters functions and corporate leaders in locations outside the home region. The fact is that many business functions can be done at other locations, besides where they have traditionally been performed. For example:

- *Thales*, a world leader in mission-critical information systems for the aerospace, defense and security markets, has applied a model of multi-domestic development – expanding from France into the rest of Europe, the Americas, the Asia-Pacific Region, and in promising new markets worldwide. Although based in France, Thales has a presence in 21 countries. Its strategy can enable it to leverage long-term customer partnerships, optimize local commercial opportunities, access local skills and resources, and meet national security requirements.¹¹
- The *SAFRAN Group*, an international company with businesses in Aerospace Propulsion, Aircraft Equipment, Defense Security and Communications, maintains worldwide operations through design, production and service companies, along with representative offices with a revenue base spread worldwide. Through its global presence, Safran sustains commercial and industrial relations with some of the world's leading prime contractors and operators, and provides responsive services and local support for all its customers.¹²

Who does it?

Many companies perform all of their business functions within the enterprise. But that's not the only way. Sometimes a business function can be done best by a collaborative partner. The options are to:

- Do it yourself.
- Do it with a partner (collaborate).
- Delegate it completely to a partner (outsource).

By determining the best source for performing a business function, a company has the opportunity to benefit from more flexible and more effective operations. For example, with a global partner, an organization could outsource non-core functions, such as finance and human resources, or share distribution and logistics responsibility. The company could perform R&D collaboratively with internal teams working on a global basis – or with outside partners and suppliers. It could even partner with another company to actually operate a production plant.

Consider these examples of partnering and collaboration:

- *Boeing*, the world's leading aerospace company, demonstrated global collaborative design in action with its new 787 Dreamliner. Large portions of the 787 aircraft were designed and manufactured outside of Boeing and outside the U.S. Components were developed in the U.S., Japan, Italy and Australia, among others. Final assembly takes place in Boeing's home location in Everett, Washington. This level of collaboration creates the need for sourcing / coordination / logistics innovation throughout the supply chain.¹³

- *Pratt & Whitney*, a world leader in the design, manufacture and service of aircraft engines, space propulsion systems and industrial gas turbines, is creating a global manufacturing base – partnering with different value-chain players on a cost, revenue and risk-sharing basis for engine production. Pratt & Whitney Global Service Partners grew revenues by more than 25 percent by increasing its focus in emerging international markets and developing distinctive offerings such as comprehensive fleet management, engine wash and line maintenance programs. Pratt & Whitney's parent company, *United Technologies Corporation (UTC)*, has also increased its presence worldwide in terms of manufacturing locations. Global manufacturing enables engineering and manufacturing responsibilities to be distributed in such a way that the product is built more efficiently. Currently, UTC has 125 engineering centers in the U.S., Europe, Australia, Asia and South America.¹⁴

What technology enablers are used?

Running a global business can be complex. And it cannot be done well without technology enablers. Today, a company should look to creating an open, standardized, cross-enterprise technology platform to support its global business processes.

The benefits can include more flexible operations, more efficient operations and improved performance. Another advantage is the ability to integrate acquired firms more easily. A globally integrated company will most likely rely on a global enterprise resource planning (ERP) system to support its single integrated global supply chain. It will also seek

A globally integrated enterprise allows geographically dispersed resources to perform as if they were working side by side in the same building.

to acquire global collaboration tools to support communications among internal teams and partners outside the company.

For example:

- *Lockheed Martin*, a leading multinational aerospace manufacturer and advanced technology company, is implementing product lifecycle management (PLM) solutions with Web services or service-oriented architecture (SOA), which focus more directly on improving product and process efficiency. To deliver the state-of-the-art F-35 Joint Strike Fighter (JSF) Lightning II aircraft, Lockheed Martin created a global, virtual design network and multi-site assembly operation. Lockheed Martin Aeronautics Company has developed a value chain spanning more than 600 suppliers in 30 countries. This robust, fully integrated global digital environment supports more than 6500 users across an extensive supplier network totaling more than 130 sites worldwide.¹⁵
- *Dassault Aviation*, a major manufacturer in civil and military aviation, is using a PLM solution for joint product development with its suppliers. An innovative collaboration and multi-disciplinary method known as virtual plateau is helping to bring the collaborators and suppliers together to build a new Falcon 7X jet. A CATIA-ENOVIA-DELMIA PLM solution brings together the product, tooling and production line around a single database. These software packages can be used to apply the “design to build” concept and enable complete product lifecycle management.¹⁶

- *UTC*, a global technology corporation with a long history of pioneering innovation in aerospace, is enabling business transformation through an outsourced procurement system yielding higher efficiencies and tighter spending control. UTC engaged IBM to create an outsourced procurement service that fully automated order processing – from requisition to invoice payment. IBM’s first step was to build a mirror of its own systems infrastructure, which included a mix of standard components such as WebSphere® Application Server application infrastructure, DB2® Universal Database and SAP R/3.¹⁷

How well does it integrate?

The goal is to run an integrated global enterprise – not a loose federation of separate regional entities that do things differently and in sub-optimized ways. Benefits to an integrated enterprise can be more internal effectiveness and knowledge sharing, improved effectiveness in working with partners, and more rapid response to global customer needs.

Each important business component can be part of an integrated, companywide process. Each can help support a “single global company” and discourage silos – *encouraging* a collaborative environment. As a result, geographically dispersed internal teams and collaborative partners can work together as if they were part of one department on the same floor of a single building.

For example:

- *EADS*, the large European aerospace corporation, is collaborating within its business and with its suppliers to improve internal efficiency and better integrate with its partners and suppliers. EADS is transforming its sourcing operations through closer relationships with key suppliers, increasing sourcing from strategically important countries outside Europe, and fostering stronger and more efficient coordination of activities across divisions. To leverage purchasing power, EADS is moving towards joint procurement through demand aggregation, demand management and harmonization.¹⁸ EADS is also improving HR integration through the development of common policies, platforms, processes, programs and shared services. HR shared services include payroll and time management in all four main EADS countries. EADS is using a common e-recruitment platform as a single source and a harmonized recruitment tool for the group.¹⁹
- *Rolls-Royce*, a worldwide leader in providing aerospace power systems, has embarked on an operational excellence program through the restructuring and globalization of its supply chain. Rolls-Royce manages a global supply chain in which it invests nearly US\$4 billion per year with 400 key product suppliers. Rolls-Royce's operations strategy is to improve efficiency through rationalization of the supply chain and by forming more strategic relationships with fewer and more capable suppliers. By simplifying and globalizing its supply chain, the company believes it can reduce supplier interfaces by 80 percent, which should benefit both suppliers and Rolls-Royce.²⁰

How innovative is it?

In today's globally integrated world, one of the few ways to differentiate a company is to develop better skills, ideas and solutions – in effect, knowing more than the competition and successfully applying that knowledge. Among the potential benefits an organization might expect to accrue from such endeavors is the opportunity to increase revenue and profits (including by reducing costs), develop more efficient operations, and sharpen its competitive edge.

We believe that a company can innovate along three dimensions: products, operations and business model. Many business leaders equate innovation only with *product* innovation, but sometimes it's even more important to develop innovative *operations* and innovative *business models*. The IBM 2006 Global CEO Study indicated that innovating the business model is likely to pay the best dividends.²¹

Following are examples of innovation in action:

- Instead of building a complete in-house MRO service organization, *Airbus*, a leading aircraft manufacturer, is applying a business model that brings the best from various partners to provide comprehensive MRO solutions to its customers. Airbus has organized its MRO business as a network of suppliers. Airbus's network includes firms such as Haeco, Timco and Lufthansa Technik in its network of service providers, and firms such as Honeywell and Satair as its spare parts providers.²²
- *Pratt & Whitney* has changed its operations to use a digital design process to help designers work on engines concurrently in a virtual environment with other project stakeholders. This virtual approach, among many other benefits, eliminates the need for costly physical mock-ups. Overall, the project is saving the company more than US\$1 million annually through the use of assembly modeling, digital mock-ups and other features.²³

Conclusion

We believe that global integration will be increasingly important for businesses everywhere, across industries. How a company responds to the challenge of a world that conducts business globally can be a key factor in helping to determine its future business success. At the same time, as stated earlier in this paper, we believe that global integration in the A&D industry is far from mature.

Going forward, A&D companies can start to improve their global integration capabilities by confirming:

1. Where each business function should be done.
2. Who will perform it.
3. What technology enablers are required.
4. How well business functions integrate with others.
5. The degree of innovation in the company's business model, technologies, operations and offerings.

We also believe that proactive companies that take on the global integration challenge *now* can begin to carve a leadership position in the global A&D industry and leverage an integrated business on a truly global stage.

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