SEPTEMBER 2009

Becoming a World-Class Supplier in Aerospace :

Prerequisites and Best Practices

AÉRO MONTRÉAL

Aerospace Cluster
of Metropolitan Montréal

Introduction

Aéro Montréal, the strategic think tank of Metropolitan Montreal's aerospace cluster, in collaboration with Sous-Traitance Industrielle Québec (STIQ), is pleased to present *"Becoming a world-class supplier in aerospace: prerequisites and best practices,"* a practical tool designed for aerospace sector SMEs as well as companies seeking to diversify.

This document aims to provide these companies with relevant information about OEM requirements regarding specialized products and services subcontracting. It also seeks to guide them in developing the critical skills or added value necessary to position them as a world-class supplier in aerospace.

This document has been made possible by the contributions of members of the working committee, Prime contractors and equipment manufacturers representatives from Québec's aerospace sector including Bell Helicopter Textron Canada, Bombardier Aerospace, CAE, Pratt & Whitney Canada, Esterline CMC Electronics, Messier-Dowty, Héroux-Devtek and Sonaca Montréal. We would also like to thank Aluminerie Alouette for its financial support in producing this valuable tool for Québec subcontractors.

Summary

A Working Group Dedicated to Strengthening Québec's Supply Chain

Globalization and rapid market changes are forcing large aerospace companies to constantly seek new ways of working to reduce their design and manufacturing costs and lead times. This is resulting in a profound transformation of the aerospace supply chain and the Québec aerospace industry is not immune. It is faced with many pressures which are making management of the supply chain increasingly complex. Among these factors are exchange rate fluctuations, credit tightening and ever-growing international competition.

While our local supply chain has obvious strengths such as the quality of its manufacturing methods and its products, it also has weaknesses. One is a high concentration of subcontractors who are too small to sometimes adequately meet Prime contractors and equipment manufacturers' needs for complex subassemblies. This situation prompted Aéro Montréal to create the Supply Chain Development Working Group formed of supply chain specialists from Québec aerospace companies. This group studied the impact of changes in the global supply chain on SMEs in the Québec sector. Several observations emerged from its work:

- The Québec aerospace industry has to cope with major fluctuations in the Canadian dollar which have a direct impact on the competitiveness of our companies abroad;
- International competition and pressure on prices are intensifying, forcing companies to seek suppliers from lost-cost countries such as China, India, Mexico, etc.;
- The Québec supplier base remains overly dependent on the local market and needs to diversify to remain vibrant;
- Implementing changes in the aerospace market is a difficult and lengthy process;
- There are significant fluctuations in the cost of primary materials and some are increasingly scarce;
- OEMs are asking suppliers to be more involved in the design phase;
- OEMs are increasingly looking to share technology risks with suppliers;
- The high number of overly small suppliers compared with global competition limits investment and capitalization capacities;
- Financial options are scattered and difficult to access;
- There is a pressing need to improve our companies' innovation capacity given swift changes in technology and their impacts on the supply chain;
- Suppliers are not clearly defining what they offer in terms of core and non-core activities;
- Generally speaking, gaps exist in terms of leadership, management, succession plans, marketing and vision among suppliers.

Global Competitiveness Thrusts

To be competitive internationally, the aerospace industry must have and develop solid competencies in 7 spheres which we define as "global competitiveness thrusts." These competencies encompass:

- Leadership and management;
- Customer relations and customer diversification;
- Key competencies and differentiating products and services;
- Innovation and technology;
- Productivity and efficiency;
- Proactive management of the supply chain;
- Sound finances to facilitate access to financing when necessary.

Table 1: *The 7 Global Competitiveness Thrusts (source: P&WC)*

Two Tools Benefiting SMEs

The Working Group has created two tools to help manufacturers and suppliers of specialized services for Québec's aerospace sector to better respond to the needs and expectations of local and international OEMs and to develop the necessary competencies to become a world-class supplier.

Tool #1
A list of prerequisites a SME needs to meet to be considered as a potential supplier in the supply chain of Prime contractors and equipment manufacturers in the aerospace sector.

Tool #2
A list of main information sources, and best practices that an SME must develop and implement to improve its chances of success in the future.

Tool #1 : List of Prerequisites to be an Aerospace Supplier

The following list is a high level summary of requirements of Prime contractors and equipment manufacturers in Québec's aerospace sector. While the nature of activities of Québec OEMs vary, most or all of the companies consulted shared some of the same principles and prerequisites.

This document represents a valuable reference guide for Québec SMEs in the sector since it describes the main competencies that need to be developed and mastered in the three product categories :

1. Products used in flight, i.e. found on aircraft that fly, and which accordingly must meet the most stringent standards;

2. Products not used in flight, i.e. not found on aircraft used in flight, for example, tools, gauges, etc.;

3. Professional design and engineering services.

Developing the list of requirements for products used in flight resulted in the following observations :

- OEMs contacted have very similar overall requirements and quality standards.

- The total acquisition cost is a factor that is becoming increasingly important in aerospace. OEMs do not only take account of unit cost but of all the costs related to the purchase, storage, use and disposition of products purchased.

- Quality, specifications, standards and certifications are inescapable requirements and OEMs expect that their suppliers develop expertise and competencies in these areas.

- A supplier's capacity to assume product development and subcontract operations while guaranteeing quality are sought after competencies. This type of supplier, which moves up its customer's supply chain, has a better chance of developing a partnership relationship in the medium and long terms. This is why OEMs emphasize aspects such as design capacity and project management, technology know-how, growth potential, etc.

- Adhering to an ethics code and good conduct is also an inescapable factor for companies that advocate such policies and values.

- OEMs want to feel confident about their suppliers. That's why they set requirements regarding financial stability, the implementation of a succession plan for key company personnel, the availability of a resource person in the event of problems, the condition of facilities and equipment, a low employee turnover rate, a health and safety program, etc.

- Companies consulted have implemented rigorous processes for monitoring supplier performance. The factors taken into account in their assessments vary according to OEMs. However, quality and respect for delivery lead-times are common elements for all.

Complying with the requirements described in the following charts does not guarantee success. To stand out from other competitors or to replace an existing supplier/ subcontractor, a company must clearly demonstrate its competitive advantages and the benefits the client can gain from a commercial relationship. Moreover, the development of the global competitive thrusts competencies is a winning differentiator.

Requirements : Summary Table

It is possible to categorize the requirements listed by OEMs and equipment manufacturers consulted according to general requirements, such as the cost of products and services, financial stability of the supplier, or attitude shown to customers, and also according to specific requirements such as product and service quality or respect for certification standards.

General Requirements	Products Used in Flight	Products not Used in Flight	Professional Services
Stabilité financière et démontrée	E	E	E
Total cost is controlled and competitive	E	E	E
Capacity to grow to support the evolution of OEM needs	E	E	
Compliance with OEM's terms and conditions	E	E	E
Respect for confidentiality of information	E	E	E
In-house engineering team and technical support	E	A	
Processing and sharing CAD files	E	E	
Use of electronic data interchange (EDI)	E		
Well-defined and efficient system and process for project management	E	A	
Use of a production planning system	E		
Use of an order-monitoring system	E		
Efficient supply management	E		
Performance measures for internal and external processes	E	A	
Demonstrated customer attitude	E		
Adequate and well-maintained facilities and equipment	E		
Software licences and certifications (according to the OEM)			E
Respect for suppliers' code of conduct	E	E	E
A succession and contingency plan	E/A		
Implementation of a continuous improvement program	E/A		
Implementation of continuous training	E/A		
Clear company vision and strategy	A		
Sharing cost structure information	A	A	
An established, documented and observed business process	A		
Use of integrated information systems and technologies	A	A	
Knowledge of SAP software	A		
An existing health and safety program	A		
Low employee turnover rate	A		
Implementation of an employee recruitment system/process	A		
Capacity to source from low-cost countries	A	A	A

Legend
E : Essential
A : Asset
E/A : Essential or asset, depending on OEM or product

Quality Requirements	Products Used in Flight	Products not Used in Flight	Professional Services
AS 9100 norms (parts suppliers)	E	E/A	E/A
AS 9110 norms (maintenance, repair and overhaul subcontractors (MRO)	E	E/A	
AS 9210 norms (distributors)	E	E/A	
NADCAP certification (subcontractors of specialized procedures)	E		
ISO 9001 Standards (included in AS 9100 to AS 9120 norms)	E	E/A	E/A
Presence of a formal quality assurance manual (ISO 9001 and AS 9100 and 9120)	E	E/A	
Compliance with OEM-specific quality requirements	E	E	A
Regulatory authority approvals (TCCA, FAA, JAA, etc) where applicable	E		
Control of tools and benchmarking of measuring tools at regular intervals	E/A		
Use of inspection stamps for product acceptance	E/A		
Quality assurance team responsible for testing final parts	E/A		
Supplier approved by an aircraft manufacturer	E		

Legend
E: Essential
A: Asset
E/A: Essential or asset, depending on OEM or product

Definition of General Requirements

Total cost is controlled and competitive. The supplier must fully understand its costs, control them and be able to offer a competitive price. OEMs consider the total acquisition cost and not only prices in their evaluation of suppliers. The total acquisition cost takes account of all the costs related to purchasing the product (transportation, quality, utilization, certification, etc.). In addition, some OEMs ask for a share of cost reductions achieved by the suppliers.

Demonstrated financial stability. OEMs want assurances that the supplier is not financially at risk and therefore reviews the supplier's financial statements, internal ratios and ratios published by trade and financial information companies (for example, Dun & Bradstreet).

Capacity to grow to support the evolution of OEM needs. The supplier must have the capacity and financial resources to respond to growth of orders (available space, equipment, expansion, etc.).

Compliance with OEM's terms and conditions. The supplier must accept the OEM's general conditions (flexibility of orders or payments, guarantees, deliveries, etc.) and technical conditions (parts marking, packaging, inspections, certificates, etc.). These conditions are unique to each OEM and available on request.

Respect for confidentiality of information. The supplier must sign a confidentiality agreement and commit to protecting information provided by OEMs. The ITAR (International Traffic in Arms Regulations) standard may be required for military products.

In-house engineering team and technical support. The supplier must have a qualified team providing technical support, design and specification clarification, product development, problem resolution, etc.

Processing and sharing CAD files. The supplier must be able to process and share CAD files (computer assisted design) with OEMs based on the software they use.

Use of electronic data interchange (EDI). The supplier must be able to exchange data electronically. File Transfer points (FTP) are sometimes used.

Well-defined and efficient system and process for project management. The supplier must demonstrate that it has implemented a good project management system with the OEM through the hiring of a dedicated resource (project manager) able to provide all pertinent information to the OEM and resolve problems. OEMs like being able to consult an organization chart of people working on their projects.

Use of a production planning system. The supplier must have a production planning system (e.g. MRP or ERP) that is reliable and assures on-time deliveries. A sophisticated system is necessary if the supplier is considered critical. If not, in-house software may be considered sufficient if it is effective.

Use of an order-monitoring system. The supplier must have an excellent system for monitoring orders and information must quickly and easily be available to the OEM.

Efficient supply management. The supplier must demonstrate that it has implemented an effective supply management system. It must be able to control and guarantee the quality of products/services coming from its suppliers and subcontractors, while managing risk.

Performance measures for internal and external processes. The supplier must demonstrate that it is able to effectively measure its internal and external processes (cycle times, delivery lead times, reject rate, set-up times, etc.).

Demonstrated customer attitude. The OEM must be assured that the supplier's processes and activities are designed to meet its needs and requirements.

Adequate and well-maintained facilities and equipment. The supplier must keep adequate facilities and equipment must be well maintained and available to respond to the OEM's needs.

Software licences and certifications (according to the OEM). Some OEMs require that their suppliers hold appropriate licences and/or certifications for major software.

Respect for suppliers' code of conduct. Some OEMs require their suppliers to sign a commitment regarding respect for human rights, the environment, ethics, health and safety, etc.

A succession and contingency plan. Some OEMs require the supplier to establish a succession plan identifying key personnel to continue operations in the event of the departure or absence of senior executives or essential employees.

Implementation of a continuous improvement program. Some OEMs require a supplier to implement a continuous improvement program for major activities that affect the manufacture and delivery of their products.

Implementation of continuous training. Some OEMs require that the supplier implement an employee training program.

Definition of General Requirements (cont'd)

Clear company vision and strategy. Some OEMs assess the quality of the company's vision and future strategy. They study the strategic planning and action plans of the supplier.

Sharing cost structure information. Some OEMs want this information to be able to understand the impacts changes could have on the prices of their suppliers.

An established, documented and observed business process. The supplier wins by proving that its operating procedures and processes are well established, documented and rigorous, and that they are observed. An efficient flow of information is also considered important by OEMs.

Use of integrated information systems and technologies. It is in the supplier's interest to show that it has reliable and integrated information systems and that they can interact with those of the OEM.

Knowledge of SAP software. The supplier must have knowledge of SAP software when this is considered an asset by the OEM.

An existing health and safety program. The supplier may benefit from the implementation of a health and safety program with preventative measures.

Low employee turnover rate. The supplier may benefit from a low employee turnover rate since this could assure the OEMs about its future ability to respond to its needs; this is especially true for small companies.

Implementation of an employee recruitment system/ process. Some OEMs prefer suppliers who have an efficient employee recruitment system.

Capacity to source from low-cost countries. Some OEMs like a supplier that is able to source from countries with low manpower costs for products or components.

Definition of Quality Requirements

AS 9100 norms for the design and manufacture of aerospace products. Recognized by an accredited organization. Some equipment manufacturers do not require this.

AS 9110 norms for maintenance, repair and overhaul subcontractors (MRO). Recognized by an accredited organization. Some equipment manufacturers do not require this.

AS 9210 norms for distributors. Recognized by an accredited organization. Some equipment manufacturers do not require this.

NADCAP certification for subcontractors of specialized procedures. Recognized by an accredited organization.

Formal quality assurance manual. OEMs pay great attention to such a manual. It is also required by ISO 9001 and AS 9100, 9110 and 9120 norms.

Compliance with OEM-specific quality requirements. These requirements are documented and vary from one OEM to another. The knowledge of various aerospace specifications may be required based on the commodity.

Regulatory authority approvals (FAA, JAA, TCCA, etc.) where applicable.

Control of tools and benchmarking of measuring tools at regular intervals. Some OEMs require that these control procedures and benchmarking are documented and clearly respected.

Use of inspection stamps for product acceptance. Some OEMs require the use of inspection stamps for acceptance of certain products. These stamps must be pre-assigned and unique to each individual.

Quality assurance team responsible for testing final parts. Some OEMs require that inspection and final tests are performed by or under the supervision of the quality assurance team.

Being an approved aircraft manufacturer supplier is an asset for some OEMs.

Tool #2 : Collection of Best Practices

This collection of best practices makes available to SMEs, in a single and common platform, intelligence that will help them become more competitive. It will also save them time and money compared with having to search for their own information.

Under the theme "global competitiveness thrusts," this collection contains 20 best practices identified as priorities by the working group. They are presented in the following chart.

Thrusts	Best Practices
Leadership and Management	Strategic planning and up-to-date action plan to foster differentiation
	Key performance indicators: "benchmarking" among customers (SCOR card and external network) and among model companies
	Key performance indicators: analysis of success and failure factors during negotiations for new contracts
	Key performance indicators: knowledge of costs
Supply Chain Management	Production management system
	Supplier quality assurance
	Supplier development (modules, "pull system," "lean")
	Supplier selection (including low-cost supplies)
Customer Relations and Diversification	Business plan including a customer diversification strategy
	Replacement and succession plan for resources
	Customer relations : program management, customer responsiveness and risk management
	Customer relations : accountability (reporting)
Productivity and Efficiency	Continuous improvement
	Continuous improvement : value stream mapping
	Continuous improvement : system for measuring KPIs
	Continuous improvement : preventative maintenance
Innovation and Technology	Introduction of new products and good practices in product development
	Plan for developing new skills
	Technical and scientific resources
	Financing packages and use of financial leverage for innovation and technology

Numerous information sources were consulted for each of the prioritized best practices and the most relevant were included in the compilation.

We also list support programs and methodologies regarding competitiveness that are currently available from various Québec or Canadian support organizations or associations, among others. In addition, reference articles, specific training, websites, consulting firms and other sources of additional information are included.

This information is categorized according to best practices in the following sections :

- Web sites
- Reference articles
- Training
- Consulting firms
- Other interesting sources

The complete compilation may be consulted directly online. We invite you to access it at the following address :

www.aeromontreal.ca/recueil.php

Lexicon and Acronyms

CAD
Computer Aided Design

EDI
Electronic Data Interchange

ERP
Enterprise Resource(s) Planning

FAA
Federal Aviation Administration

FTP
File Transfer Protocol

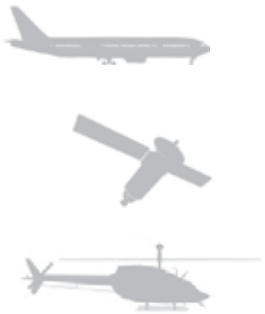
ITAR
International Traffic in Arms Regulations

JAA
Joint Aviation Authorities

MRP
Manufacturing Resource(s) Planning

NADCAP
National Aerospace and Defense Contractors Accreditation Program

TCCA
Transport Canada Civil Aviation



In partnership with :

STIQ
Sous-Traitance Industrielle Québec

Communauté métropolitaine de Montréal

Québec

Canada

AÉRO MONTRÉAL

Aerospace Cluster
of Metropolitan Montréal

380, Saint-Antoine street, suite 8000
Montreal, QC H2Y3X7