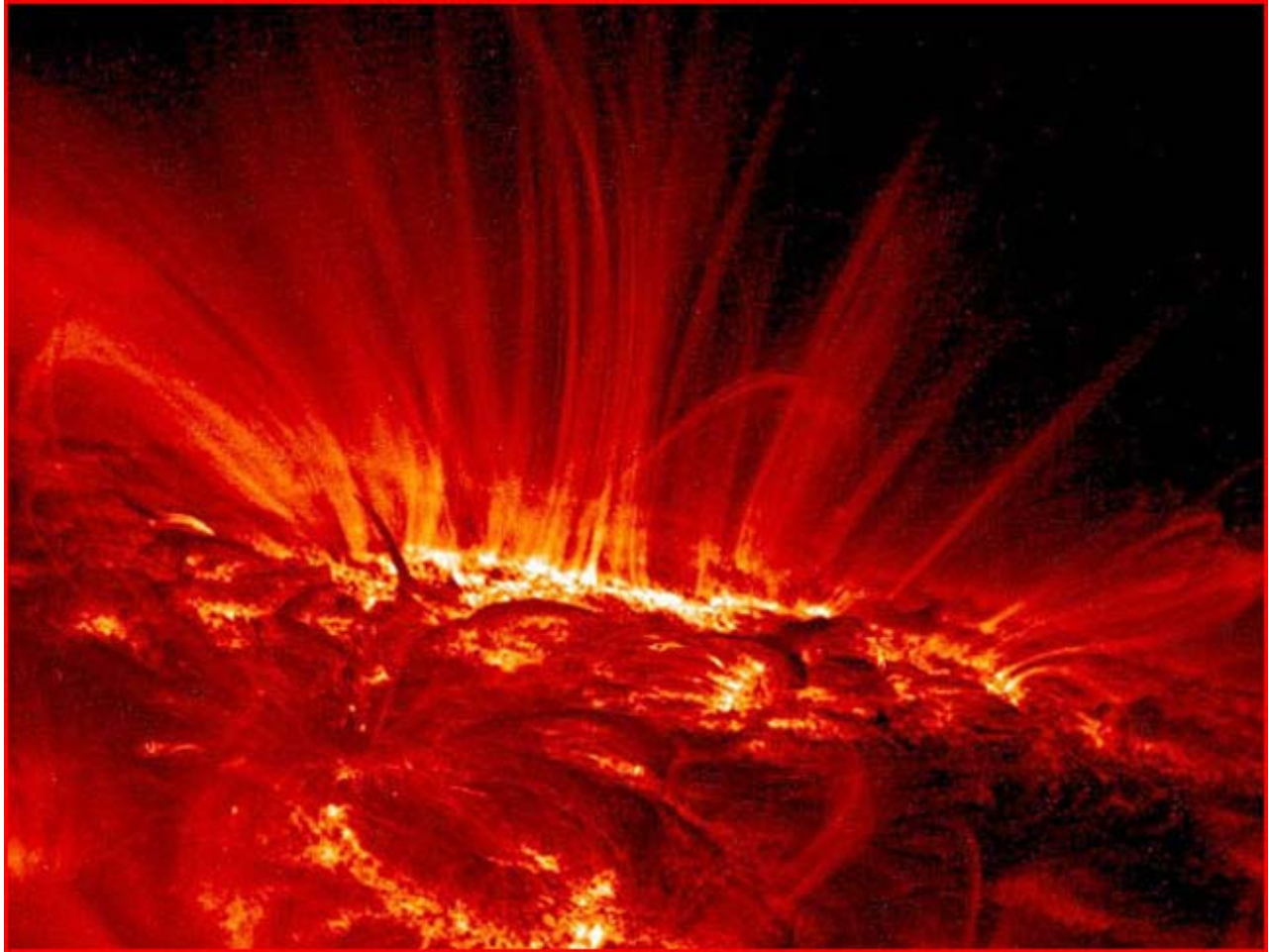


*Changing the Paradigm for the  
Machine, Tool, Die and Mould Industry  
in Windsor Essex*



*WindsorEssex Development Commission  
Submitted by: Munro & Associates, Inc.*

**WindsorEssex**  
DEVELOPMENT COMMISSION

**Munro &  
Associates, Inc.**



PROPRIETARY AND CONFIDENTIAL

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## EXECUTIVE SUMMARY

Munro and Associates, Inc. performed an in-depth study of the Machine, Tool, Die and Mold (MTDM) industry in Windsor Essex by interviewing 45 companies and collecting survey data from approximately 140 companies (representing 60% of MTDM firms in this region). The data was analyzed for accuracy and implications, and the results of that analysis are reported in this document.

There remains a significant threat to the MTDM industry from several sources, including:

- Aggressive offshoring by the automotive OEMs
- Aggressive financial terms imposed on the industry by Detroit 3 OEM PPAP<sup>i</sup> requirements
- Financial fragility and bankruptcies of the traditional automotive Tier 1 and Tier 2 supply base
- Global competition from lower-cost economies
- A Canadian dollar at par with the U.S. dollar

It is critical for local MTDM firms to develop a balance in terms of customer mix, ensuring that no more than 35% of a company's total business is reliant on the Detroit 3 automotive OEMs. The demands of the automotive market have served the MTDM industry well in giving them valuable and transferable skills which can be deployed into new market sectors such as aerospace and medical.

Analysis shows that there will be further contraction of the industry in the coming 3 to 5 years where an additional 18 to 25 shops will close in our region. Action must be taken without delay to support those companies who are willing and able to move into new market sectors to prevent further closures. This is the most important market segment in the Windsor Essex region representing \$2.1 Billion annually in revenues and payments in terms of GDP. Using a conservative multiplier of five<sup>ii</sup>, the impact (loss) of economic activity for this sector is in excess of \$10.5 Billion annually.

It is important for local shops to understand the importance of Industrial Regional Benefits (IRBs) to the aerospace industry, and how they can leverage those benefits to secure new work. In addition, extensive market research and intelligence must be provided by the industry associations and communicated to their membership. From this information, a regional strategic marketing plan should be developed, shared and executed without delay.

As part of this report, Munro and Associates have gathered survey information about a large portion of companies in this region to be built into a searchable database and shared with key contacts such as field officers for DFAIT (Department of Foreign and International Trade); the Canadian Consulate offices; and industry associations who are in a position to recommend work opportunities or supplier connections. Other recommendations follow this report.

Companies must begin to take steps to understand the certifications required to compete in new industries outside of any ISO certifications they may hold. Once they have an understanding of the

requirements, and which certifications will benefit them moving forward, they need to undertake the application process.

Of critical importance for local MTDM shops is the need for business plans and a concerted and professional marketing effort. Our recommendation is that a course or series of workshops be developed for busy business owners to help them move forward with clear, strategic business plans. Additionally, the WEDC should consider contracting a marketing agent on behalf of and in cooperation with the MTDM shops to ensure that a consistent message is being delivered to external markets. This will help to 'gel' the region and allow them to better utilize limited funds for marketing themselves as a group.

There are many and varied opportunities abroad, particularly in Europe due to the exchange rates between the Euro and the Canadian dollar. To compete in this market, there are some basics that must be implemented, including the understanding of a total accounting cost of dies, moulds and machine tools; a concerted marketing campaign advertising the region and the benefits to European companies of outsourcing work to Canadian suppliers; and attending key trade fairs such as Farnborough International Airshow in England and the Frankfurt Auto & Machine Tool Show in Germany.

There are also immediate opportunities at home in the aerospace sector and oil sands. It would make sense for local companies to join industry associations for networking and work opportunities with an active presence at meetings and events.

There are several key initiatives that WEDC can address by lobbying the government in partnership with industry associations, such as: specific job training support as well as education and training funding for advanced methodology; anti-dumping legislation for low-cost economies; addressing senior level executives at the automotive OEMs to charge back to the supplier for corrective action required on imported tools; and elimination or modification of PPAP practices.

The following report explores the significance of the industry to this region, and makes specific recommendations to move forward.

# CHANGING THE PARADIGM FOR THE MTDM INDUSTRY IN WINDSOR ESSEX

## *A Region & Industry Sector in Transition*

Sandy Munro  
Munro & Associates, Inc.

### FORWARD

The Manufacturing Base and the MTDM (Machine Tool, Die and Mold) industry in Windsor Essex is currently experiencing an economic tsunami the likes of which have not been felt since it came of age in the early 1940s. From its birth in the 1940s through the late 1980s, Windsor Essex was **1 of the 3 Global Centers of Excellence** in the world (the others being Marinha Grande, **Portugal** and Stuttgart, **Germany**). During World War II, Windsor/Detroit was considered 'the arsenal of North America'. At one point up to 40% of Machine Tools, 45% of Molds, and 30% of Dies world-wide for virtually any product were made in Windsor Essex. The region is racked with chronically high unemployment, currently 9.4% as assessed by Statistics Canada in February 2008; the highest unemployment level in the province and tied for the highest unemployment in Canada.

The threat to the viability of the MTDM industry is very real and comes from multiple sources including:

- Aggressive offshoring by the automotive OEMs.
- Aggressive financial terms imposed on the industry by Detroit-3 OEM PPAP requirements.
- Financial fragility and bankruptcies of the traditional Tier 1 & 2 supply base.
- Global competition from lower cost countries.
- A Canadian dollar that has appreciated more than 70% in less than 9 years with further appreciation (vis-à-vis the US dollar) expected.
- An industry just beginning the important process of lobbying with one unified voice.

Toolmakers, which were once considered craftsmen, inventors and gentlemen and rose to the helm of their companies **need a totally new set of skills to lead their companies**. Current leaders are being challenged by global competition to quote against lower cost countries. Being a good tool-maker is now not nearly enough in terms of skills. A company owner must have keen business acumen, be financially astute, intuitive, and methodical and savvy enough to know when he can be competitive and when to walk away. They must be innovative in reducing the top line, while increasing the bottom line. Adding to this is the burden of needing a team of people to deal with significantly greater and growing administrative issues, increasing Government legislation and compliance, and human resource issues. In short, the task becomes much more complicated than it was when the business began.

With capital constraints enforced by entities like banks and alternative lenders, the pressures on an MTDM business owner are elevated to a new level with viable companies closing their doors and

laying-off highly skilled workers, many of whom are too young to retire and have little savings forcing them to move out of the region or remain unemployed.

Machines are now employed to do what a highly skilled craftsman ***used to do*** by hand. Computer numerically controlled machines (CNCs) are widely available. Lower cost countries (China in particular) are aggressively buying these machines with low-interest or no-interest funding from their governments and financial institutions. The Chinese have stated their economic plan to dominate the Global MTDM industry by 2020. The playing field is now visibly tilted against the traditional MTDM industry and without an orchestrated effort to ***'change the paradigm'*** and revitalize the sector, the highest skills and some of the highest paying technical jobs will be lost, negatively impacting our GDP and our National balance of payments.

# 1. MOVING THE MTDM INDUSTRY FORWARD

## *Defining the Mindset and the Future*

The first question we ask any client or company in trouble is, “*What is the objective of your business?*” If the answer is anything other than “*make a profit,*” then we know the company is in serious trouble. We have asked this question of a number of MTDM companies in Windsor Essex and never once received the “appropriate” answer even after coaching individuals several times. ***That is the first element of the paradigm in the mind-set of MTDM owners and operators and that must change.***

In Sun Tzu’s “**The Art of War**”, he clearly states that “*...no battle can be won until there are three things in place...*”

These three things are:

1. Psychological preparedness.
2. A clear objective.
3. An understanding of the enemy to be attacked.

Despite current concerns, our research has shown that few companies in this region are prepared to do battle. That must change. Survival is not mandatory...it is an option for those who evolve.

The facts unearthed by previous studies clearly show a stagnant to declining market in both the Detroit-3 automotive sector and MTDM shops that tie themselves closely to the Detroit-3 automotive industry.

Munro’s process is to analytically identify the issues, target the market short falls using a gap analysis and design the output to suit the psyche of the intended audience; in this case toolmaker/shop owners. We will be proactive not just with suggestions, but as an involved team member. Munro will roll up our sleeves and work alongside any tool shop that wants to succeed.

Observing trends is always helpful; however, one must also be cognizant of the fact that by the time you see the data the information is already out of date. The real objective is to predict where the future lies. Our goal is to dig deeper in all areas to understand the root cause of the issues and identify a process for problem solving. We wanted to know whether the problems are related to market changes, psychological problems, product design, process issues, technology gaps and/or training issues.

In all cases we were interested in what type of process and discipline is in place to identify problems and contain or capitalize them. In other words, how do we identify the root cause of problems to create and implement the appropriate and effective countermeasures to prevent the problem from recurring?

The closest example of this was the May ‘96 study which was the best predictor of what was inevitably going to happen. To see the future one must view the trends and data. Under the Nariyuki method of analysis, a minimum rate of steady 8% growth year-on-year will maintain a base of zero. With flat growth rate and a declining population in Windsor Essex it becomes obvious that a downward trend is in place and has been so for at least 10 years.

If we think using Toyota problem solving methods, we should be asking the “5 whys” of each question we pose. The obvious first question is, “Why has little (if anything) been accomplished since these earlier studies were done?” The information is accurate, the conclusions are clear, and previous studies are suggesting the same solutions. So:

Why are we doing this again?

Why was there no implementation?

Why couldn't the benefactors of the study change anything?

Why were there resistors to progress and who were they?

Why didn't things change?

Faced with the potential collapse of 40 – 60% of the MTDM industry and potential permanent loss of over 2,000 highly paid, highly skilled jobs in our region, the industry is beginning to understand that changing, evolving and diversifying are the only ways to preserve their businesses and livelihood.

It is critical to develop balance in every business in terms of customer mix. There is a dependence on the Detroit 3 automotive OEMs and suppliers (which should represent no more than 35% of a company's total business). Developing non-Detroit 3 automotive business and working for other industries, both domestic and foreign, including aviation, defence, medical devices, oil and gas is prudent. The automotive industry is far advanced in comparison to many other industries. Transposing skills and abilities from automotive to other sectors is far less difficult than one might believe. The demands of the automotive industry have served the MTDM industry well; demanding clients and technical requirements have helped the MTDM industry develop into what it is today. It is time for the MTDM to move itself forward and that means changing the way things are done, embracing new technology, new software and new methods, working 24/7 operations and focusing on developing new export markets.

In short, the industry has reached the conclusion that it is in their best interests to embrace change and adopt a new paradigm for the direction of their business or face the death of their company and their industry.

## 2. IS IT TOO LATE TO TURN THE MTDM INDUSTRY AROUND?

It is late in the cycle and therefore impossible for a complete turn-around to take place. The fact that so many shops have closed can actually help the survivors, who may have resisted change, new technology, new methods, and new processes to embrace change and develop new customers unaffected by the economic cycles of the automotive industry.

Based on our analysis, we predict that in the next 3-5 years, an additional 18-25 MTDM shops will close in the region with 7-10 of those lost in 2008 alone. At least 8 of those companies will fail due to bankruptcies and reorganizations of the tier 1 supply base. Of the balance, 6 companies will close due to cash flow issues and 4 will close due to a lack of succession planning and be liquidated. The last 7 will be companies who took no action to change.

Without question, Government intervention is called for in this case, as it requires extensive training, marketing, re-education and a reallocation of resources to an industry that has long been a cornerstone of economic development and represents major value in Canadian exports. Not providing support to this industry to transform itself would result in a **C\$2.1 Billion** loss annually to the economy in terms of GDP. Given the wages and disposable income the people in this industry generate (the MTDM industry is generally given a multiplier of 5X because of the wages and the amount spent in acquiring components) ***the impact (loss) of economic activity would be in excess of C\$10.5 Billion annually.***

With such a small number of people accounting for such a large percentage of revenue and GDP in our economy, we cannot afford to ignore the impact of this sector. The innovation and technology that this industry develops is significant. Without question, this sector is a major contributor to the stability and growth of the Windsor Essex economy.

The need to survive can bring the industry together in a manner which would be akin to the initial birth of the industry with better asset utilization and a unified approach to speaking with one voice as an industry. Even companies that failed had effective workers with advanced skills in many areas and as a result, they need very little training to be productive at another tool shop. In the short-term (next 1-3 years) 200-300 workers will lose their jobs in this industry. For those who remain, the trend will reverse after year 3, (2011) due to diversification efforts that are now underway sparking another shortage of new apprentices with the latest skills and abilities. The turn-around may actually take place more quickly depending on the success rate for the development of new diversified customers. This diversification will break the cycle that the MTDM industry in Windsor Essex is now subject to, but it cannot be done without the co-operation of all involved.

Having said that, Employment Ontario and the Ministry of Training, Colleges and Universities (MTCU) need to acknowledge the long lead time to train a worker from apprentice to "asset" and focus on working with companies to develop and institute on-going training aimed at cutting edge processes and methodologies. This is a huge shift in thinking that is being actively embraced and executed by our competitors in regions such as South Texas.

Ongoing training and education must be the new focus for the MTDM industry. Training of apprentices remains vital, as do 'second-chance programs'; however, new continuous learning and

improvement programs must be developed to keep the MTDM industry and the country at the leading edge of global excellence and competitiveness.

Munro & Associates, Inc., in conjunction with the Windsor Essex Development Commission, the Ontario Ministry of Economic Development and Trade (MEDT), Canadian Association of Moldmakers (CAMM), Canadian Tooling and Machining Association (CTMA) and Canadian Machine, Tool, Die and Mold Federation (CMTDMF) will be putting forward new opportunities for those companies who complete the required information. A series of workshops and seminars will deliver new skills to take companies to the next level in the initial stages facilitating the paradigm shift needed.

A. Sandy Munro, CEO of Munro & Associates, Inc., on a fact-finding mission to Europe was shocked to find how far Windsor Essex had fallen off European companies' radar. Many had been led to believe that the core of the MTDM business in Canada was in Toronto, Winnipeg and Montreal. Senior staff in 5 of the largest European companies (EADS, Volkswagen, BMW, Mercedes and Thales) **had never even heard of Windsor**, or the capabilities of the MTDM industry here. These companies have been outsourcing key work for the past 5-years to locations *other than* China and India demonstrating enormous lost opportunities for our region.

The Region and the industry as a result of these findings must either move to raise its profile, or face irrelevance as a Global Supply Source. Marketing is the key!

Our view is that while very late in arriving, there is significant opportunity for companies from Windsor Essex to utilize their skills, abilities and available machine capacity to win significantly profitable work but ***speed is of the essence.***

### 3. INDUSTRIAL REGIONAL BENEFITS - A PRIMER

In Aviation, Defence, and Aerospace Industrial Regional Benefits (IRB's) which are defined and approved by Industry Canada are ***an important support for the MTDM industry in our Region to understand and use.***

In short, companies such as Boeing and Lockheed Martin, as a commitment to a *'buy-Canadian'* program have committed to purchase ***\$17 Billion dollars of goods and services*** from Canadian sources as an offset to Defence sales made to the Canadian Federal Government.

Foreign companies who wish to sell their goods and services in Canada must commit (as part of the contract process) to buy an equivalent amount of goods and services over the life of the contract. That may involve 2-year or 20-year service contracts or other types of services, but the goods element should not be overlooked both in the short and long-term.

Sources need to be approved in advance by Industry Canada to qualify process sheets. Activities must be verified to ensure they hold sufficient Canadian content. Once done, this mechanism alone can lead to a host of new opportunities in the Defence and Aviation industries.

The offsets (IRB's) are normally on a 1-to-1 or dollar-for-dollar basis; however, partnering with a certified research institute, such as the Canadian National Research Council (NRC) or a Canadian University can lead to a *multiplier of up to 5X* to be used. In other words, if a Windsor Essex based company is working co-operatively with the University of Windsor and is supplying an outside company such as Boeing with \$1 Million worth of goods and services, Boeing could get credit as if it had purchased \$ 5 Million worth of goods and services. *The value of a relationship between the company and University (or research institute) to the end purchaser is extremely important* and can be a significant incentive for an OEM to work with companies in our region.

## 4. WHAT ELSE DO I NEED TO DO?

We have administered a survey of local companies to determine in house skills and equipment list(s) to identify what opportunities would best fit them, and will provide this raw data to the WEDC. This data should be compiled in an easily searchable format such as a database.

Immediate opportunities exist in Aviation, European Automotive, European MTDM and Medical devices. Further opportunities can be highlighted to include Asian Automotive, Oil and Gas, Defence and additional Aviation and Medical, as well as additional European MTDM.

Companies still need to lobby and raise their profile with the end OEM and tier suppliers. They also need to be engaged members in local MTDM associations, and in industry associations they become involved with (e.g. the Ontario Aerospace Council). This means showing up, attending meetings and regularly participating in events to learn about new industry sectors. It can take 2 years to build credibility before the first real benefits of the relationship are evident. Some may benefit sooner due to specific opportunities that arise and a bit of good luck.

Last October (2007), the Ontario Aerospace Council hosted Embraer, a major global manufacturer of small regional jet aircraft based in Brazil. Embraer was looking to place upward of 45,000 hours of machining representing 5,625 man-days or 17.5 man-years of work in Canada. While it met some of its needs, there are still needs that must be addressed. We must move quickly to avoid being left out of further work opportunities.

The Ontario Aerospace Council counts Windsor Essex based companies among its members and made a presentation about its activities at the EDC Annual Conference in Windsor in October, 2007. Companies in the region are encouraged to be active members to take advantage of networking opportunities. Membership in this organization also allows members to access the Aerospace Industries Association of Canada (AIAC) which is the Federal equivalent of the OAC. The Council should be encouraged to visit Windsor Essex in the next few months to speak about their organization once again. Their website is [www.ontaero.org](http://www.ontaero.org)

Trillium Medical Technology Association (TMTA) evolved in 2005 from the Association of Ontario Medical Manufacturers (AOMM) and while they are Ontario-centric [most members tend to be in the Greater Toronto Area (GTA)] members and associate members from anywhere in Ontario are welcome to join. Meetings are held quarterly in the GTA. The association should be encouraged to visit Windsor Essex to answer questions about their industry from interested MTDM companies. The web-site for the association is [www.tmta.ca](http://www.tmta.ca)

We encourage the new areas of potential client development in terms of industry (to be based on companies' capabilities to one at a time) ensuring that the company is successful and has the resources to diversify at a reasonable rate.

## 5. INTERVIEWS, DISCUSSIONS

### Issues and Gaps Facing the MTDM Industry

The following Q&A section was developed as a result of multiple interviews with 45 companies in the MTDM industry between December 2007 and March 2008 in the Windsor Essex Region. The percentage of companies who are affected by any specific problem (rounded to the nearest 5%) is noted after the word **Problem** that heads each question. The following is a summary of what we deemed as having the greatest impact on the industry.

#### **Problem (90%)**

1. Despite new technology, the MTDM industry is still using traditional methods precluding them from achieving the full effect of the technology investment made.

#### **Observation/Solution**

New technologies require more training and a commitment to implementation companywide without exception. Ensuring that employees understand the impact to the bottom line will help them embrace a new way of doing things.

#### **Problem (90%)**

2. Scheduling work on the shop floor is a real problem. Projects are not generally scheduled under a master plan with all departments in real time.

#### **Observation/Solution**

Munro offers proprietary software available as a shop floor tool that can be implemented at interested shops. There are several work scheduling software programs on the market that can be implemented at the shop level. Steps should be taken at management level to ensure that a solution is implemented to answer this challenge.

#### **Problem (95%)**

3. Quotation of tooling is typically completed through trial and error, or done in a rudimentary manual method and at best, is based on similar tools completed historically (i.e. last time, I sold that tool for \$xxx, so I'll quote the same this time). There is no budget set for tools or cost compared to a projected budget; as a result the shop does not know how they performed on a given tool until after it has been completed.

#### **Observation/Solution**

Companies must understand their projected budgets for tools and cost comparisons. The use of software can help manage this challenge.

#### **Problem (85%)**

4. The industry views tools as an art form and prices them accordingly rather than looking at its tooling operations as a combination of commodities.

#### **Observation/Solution**

Some suppliers are beginning to build tools for a specific tool life and durability as outlined by their customer in the initial discovery phase, and build to meet a specific size run. Evidence shows however that this is not the norm across Windsor Essex shops. An understanding of business principles for quoting procedures is required by local shops. As one of several alternatives, Munro offers workshops in Lean Design to help understand cost metrics, increase standardization and reduce inventory carrying costs.

***Problem (95%)***

5. The industry has not used standardization to its fullest advantage. Every tooling detail is produced as a custom piece from a blank piece of steel as opposed to from a semi-finished piece of steel.

***Observation/Solution***

Evidence shows that standardization is not employed at most shops in our region. As one of several alternatives, Munro offers workshops in Lean Design to help understand and minimize the costs associated with any given tool. Implementing “lean processes” within a shop will help with this effort.

***Problem (90%)***

6. Engineering is typically done by tradition, not based on engineering calculations. As a result tooling blocks can be larger and built much heavier than required representing additional costs in material and labour.

***Observation/Solution***

Understanding lean principles and employing an experienced engineer can help companies revamp their thinking and processes to ensure that they are purchasing and cutting only what they need to.

***Problem (95%)***

7. Thermal calculations are generally not taken into consideration when a tool is assembled from various materials, causing issues with differential thermal expansion.

***Observation/Solution***

Engineers who are intimately involved with such calculations need to be hired by tool shops and brought into the process, either on a full time basis or as a shared resource.

***Problem (95%)***

8. Tooling is often designed with inherent production inefficiencies causing slower tool speeds in higher piece costs for the customer.

***Observation/Solution***

The customers’ piece rate/hour must be taken into account when designing a tool. Demonstrating innovation and showing the customer how to increase production speed by smarter tooling, or simplifying tooling to take costs out of the initial designs can become a strategic advantage for shops.

***Problem (90%)***

9. Canadian tooling shops are largely unaware of technologies available elsewhere in the world, specifically Europe.

***Observation/Solution***

Industry associations need to become more effective conduits of what is cutting edge technology in the global marketplace and help members understand what their global competitors are up to. Companies also need to take an active role in educating themselves about processes and equipment that is cutting edge. An on-going strategy needs to be developed to address this very real concern.

***Problem (85%)***

10. Management in many tooling shops is reactionary as opposed to planned, lacking the ability to foresee problems before they arise.

***Observation/Solution***

This is partly due to a lack of planning and process sheets, combined with a lack of discipline, experience and ability. Creativity training and education about software options will resolve many of the issues.

***Problem (90%)***

11. Most tool shops have a business plan to satisfy lenders as opposed to following it as a living document to help them proactively and strategically navigate their business.

***Observation/Solution***

Many companies are in survival mode, rather than investing in long-term or even short-term planning. An intensive and effective business course should be offered to management at tool shops in our region, possibly delivered by the Odette School of Business in cooperation with CAMM, CTMA and CMTDMF.

***Problem (95%)***

12. The MTDM sector (as a whole) has followed the automotive industry without looking for other viable options.

***Observation/Solution***

Our MTDM workforce is highly skilled and educated. Through diversification and industry cross-pollination the region can grow. The automotive industry is one of the most demanding in terms of skill levels; however, other industry sectors have been ignored due to the perception that there are too many barriers to entry.

***Problem (90%)***

13. Shops activities are being controlled by their customers, making it difficult for shops to control their project management.

***Observation/Solution***

Quotes need to be strictly adhered to in order to diffuse this influence. Unless the tool is behind schedule or the customer requests changes/modifications, there should be no reason for interference. When an accelerated delivery date is requested/required, customers must compensate the shop for the delay in other areas. This needs to be specified in the initial p.o. or contract. With proper shop floor planning, program acceleration is not required. Engaging bodies like the EDC and other financial institutions to help resolve issues of delays (in approval) and payment will benefit regional shops.

***Problem (90%)***

14. Mistakes made in programming are not always apparent to management, but appear in the form of increased employee hours against a given tool.

***Observation/Solution***

Effective software is required to properly quote and plan jobs; however management must be diligent in tracking actual time spent vs. the estimate, and work to resolve issues where they are identified.

**Problem (+90%)**

15. Workflow within most shops is poor in terms of equipment layout due to additions over months or years.

**Observation/Solution**

Some improvements are available by implementing lean approaches; however, a larger scale is not always feasible due to the cost of moving large pieces of equipment and their footings.

**Problem (95%)**

16. Everybody wants to be a fireman and hero. When there is a problem, staff and management alike prefer to drop what they are doing and rise to the challenge.

**Observation/Solution**

Tough management decisions must be made in terms of scheduling, customer interference and acceleration of projects. The development of a strategic plan encompassing project implementation and outsourcing is crucial. Sticking to commitments and timelines is critical. Continental shifts, or split shifts can be part of the solution.

**Problem (90%)**

17. When additional engineering changes are incurred, the effect tends to be added to other jobs in the shop to even the load. Improper accounting of resources given to any one job can cause misquoting of future jobs or an unrealistic view of which jobs are profitable.

**Observation/Solution**

Companies and contracts must be written in a way that allow for an accurate assessment of any engineering change. Metrics and costs associated with the change and the impact they have on other tools in progress must be considered. Costs must be defensible and an accurate reflection of costs incurred. Other work needs to be recalculated at a new (higher) cost to keep the tool that was bumped on schedule. Tool shops must quantify this cost.

**Problem (90%)**

18. Emergency work or emergency repair is the most disruptive thing that happens to workflow on the shop floor. There has to be a way to deal with this without affecting the workflow of other projects going on in the shop.

**Observation/Solution**

There are a number of solutions that lend themselves to solving this issue. One is split shifts in the workforce, where gaps are created during the workday to allow for over-time and repairs to be done manually. This also tends to make available gaps in machine time to 'brush-out' smaller changes.

**Problem (80%)**

19. There is no good way of determining where the bottlenecks are, what they are and what is causing them on the shop floor.

**Observation/Solution**

The generation of process sheets with better management tools, including effective software, will help to identify bottlenecks. Once the bottlenecks are identified, they can be outsourced to slower or smaller shops that have open capacity by developing partnerships with these shops *before* they are required. If the contract or term of the tool produced is stable and long term, the purchase of equipment can be justified with a business case. Lean Design can be used to examine root causes to determine if the process can be changed to eliminate the bottlenecks. Additionally, a 2<sup>nd</sup> or 3<sup>rd</sup> shift could be added to help solve the issue.

**Problem (95%)**

20. Tool design requires more science and engineering to ensure that it is efficient and easy to manufacture.

**Observation/Solution**

Workshops covering Lean Design, Design for Manufacturability (DFM) and Design for Assembly (DFA) can effectively address these issues. Tool makers must make a case for the cost of additional output from any tool design for the customer's benefit. If the customer relationship is long term, or has the potential to be long term, the shop should work closely with the customer to offer choices based on innovation as well as 'standard' options.

**Problem (95%)**

21. The MTDM industry is slow in adopting and using new tooling systems and developments.

**Observation/Solution**

Only those companies who diversify their customer base and develop new skills will succeed. Those who don't do so need to develop an exit strategy from their business.

**Problem (95%)**

22. The MTDM sector does not always use the best strategy to build the job at hand.

**Observation/Solution**

The industry has traditionally been focused on getting the tool out the door, getting paid and getting the next job. New processes can be implemented with accurate quoting, process sheets and control of flow. As a company gathers data about employee and machine hours, they can make the necessary changes to the processes on the shop floor. Ownership must continue to learn and stretch and maintain a commitment to new processes throughout the transition. Also, traditionally the ownership and management have come from a shop-floor history and position, and require formalized training to develop the skills needed for business.

**Problem (95%)**

23. Many shops have a tendency to underutilize talented staff (i.e. a toolmaker operating a machine) rather than face a lay-off of a key employee. They do not use low cost labour to their best advantage.

**Observation/Solution**

This stems from a desire to keep people busy and employed, with a shortage of good, skilled labour. Human Resources (HR) needs to play a greater role in applying the upgrading of skills, retraining and work-sharing as it can help prepare the company for new work and new process integration. Lobbying of the Ministry of Training, Colleges and Universities (MTCU) to address this while the industry is in transition is required. Companies must also work to diversify their customer and industry base to offset the current automotive cycles.

**Problem (90%)**

24. People managing the floor do not always understand the business end of tooling; and their objectives can be at cross-purposes to the business success of any given job.

**Observation/Solution**

We observe in many cases that the supervisor is mainly concerned with getting the tool out the door; engineering is mainly concerned with late changes to the design from the customer. Cost and tracking control is needed to ensure that '...the tool makes a profit'. Balancing opportunity, operating methods and technology with a valid business plan takes experience. In any case, people with the technical experience can be taught the new skills that are needed to effectively run a

business, but they must be willing to invest the time and resources. This is a key opportunity for a special program to be developed at the University level for the industry.

**Problem (100%)**

25. We can't compete with China or other low cost countries.

**Observation/Solution**

We need to define and market our advantages in terms of speed, proximity to market, and tooling that is guaranteed and problem free. Chinese industrial cities that are capable and competitive with Windsor costs are rising rapidly. Considering the time it takes for tooling to arrive from China (8-12 weeks for shipping alone) and further congestion in the ports expected, there is no reason to abdicate work. Opportunities exist in repair and upgrading of overseas tooling.

Lobbying the OEMs to back charge the Chinese tool shops could effectively limit future competition. Tax-breaks for North American sourced tooling might be another option with duties applied against imports found to be dumping. For more ideas on how to deal effectively with the Chinese and other countries that are dumping tools and parts into the North American Market see page 33.

In the past if tooling was "Small, Simple, Slow", it went to Shanghai; tooling that was required to be Complex, Fast and Lean (CFL) was thought to be better suited for North American sourcing. It is clear the Chinese would like to make in-roads on these more complex tools. Being innovative in manufacturing the tool, utilizing Lean Design, following DFM and DFA guidelines, tool standardization and 'right-sizing' the materials used to make the tool are all elements that can give companies here a strategic edge.

**Problem (100%)**

26. We can't compete with the high Canadian dollar and high costs.

**Observation/Solution**

We can compete, but we need to be innovative. Removing costs from the tooling process from design to manufacture using lean principles, including lean design, streamlined inventory, and process innovation are the recommended ways forward. We can compete successfully, but we need to focus on shorter faster lead times, 3-shift operations, tool-standardization, right-first time and right-first part.

**Problem (0%)**

27. We can't get the government to give us any help.

**Observation/Solution**

The Ministry of Economic Development and Trade (MEDT) and the MTCU are listening to the industry. MEDT provided the financial support for this report and for the second phase where the findings will be presented. The MTCU is currently exploring ways to support training and education for this industry. As it stands today, the industry does not yet effectively speak with one voice (unlike the APMA – Auto Parts Manufacturing Association). That must change! For the industry to get the attention it needs to renovate apprenticeship programs, deal with short-term work-sharing, develop effective marketing programs and develop effective training and upgrading of skills programs using cutting edge technology, as well as attack the issues of unfair competition and dumping, they must band together with a single purpose and a single message to higher levels of government.

**Problem (85%)**

28. We aren't getting the right kind of support from Employment Ontario, MTCU and Manpower.

**Observation/Solution**

Training programs and standards have not been updated recently. Employment programs offer monetary benefits and retraining to the unemployed. We need to be pro-active and help companies develop employees who are leading edge in order to capture new business and diversify. That is what is happening where economic growth is taking place in areas like South Texas, China and India.

**Problem (100%)**

29. The impact of legislated voluntary overtime over 48 hours hurts our ability to compete with Michigan among other states.

**Observation/Solution**

This constraint puts our region at a disadvantage to our nearest competition – Michigan, who does not have legislated overtime or working hours.

**Problem (85%)**

30. Asset utilization is not optimized across the business.

**Observation/Solution**

We have found few companies addressing this issue. Assets such as engineering tubes with CAD licenses are used on a single shift in most cases. An exception to this, and example of best-practice is Anchor Danly who run 2 – 3 shifts in engineering to ensure that quotes are returned to customers within 24 hours. Other examples of companies addressing their asset utilization most effectively are Platinum Tool, Windsor Mold, Redoe Mold and Continental Tool who all run extended, split and continental shifts. Additionally, energy rates will be lower in off-peak hours with new legislation being implemented, representing a cost savings to companies running their heaviest equipment on the 3<sup>rd</sup> shift.

**Problem (95%)**

31. Companies don't employ the 'right kind' of engineering people.

**Observation/Solution**

Many companies don't employ engineers at all. Many companies looked at engineers as people who were too smart with limited application experience, and required retraining. We now see a specific need for plastics, mold and design engineers who understand materials and thermo-dynamics intimately.

**Problem (85%)**

32. We can't make parts for the aviation, defence industry, medical device or nuclear industries because we aren't certified.

**Observation/Solution**

While specific certifications are needed for certain industries, there are a number of areas within those industries which do not. In general (and speaking in automotive terms) functioning as tier 2 suppliers is not an issue. ISO 9001:2000 certification is the starting point. If you are ISO 9001:2000 certified you are in a good position to start at the tier 2 level. Certification for things like aircraft parts at a tier 2 level (or lower) also only requires ISO 9001:2000. For more advanced work at a tier 1 level (termed fly away parts) suppliers require the next level of ISO. Additional certifications and guidelines also come into play for tier 1 suppliers that do not impact tier 2 or 3 suppliers. For more on this subject see page 22.

**Problem (90%)**

33. We can't be competitive with the Europeans.

**Observation/Solution**

Given the average fully-burdened shop rate in Windsor Essex is an average C\$75 per hour, and the average fully-burdened shop rate in Germany is an average of C\$103 per hour, we can be competitive and profitable as a subcontractor to European companies. For additional detail, please refer to page 29.

We must assert our region as being the most experienced, advanced, capable, and best value location for tooling not only in European markets, but in growing Middle-Eastern countries as well where our expertise can be utilized.

**Problem (95%)**

34. What are the keys to our success going forward? What must we focus on?

**Observation/Solution**

We are a Global Center of Excellence in terms of MTDM, tooling and abilities. It is important to remember that we are and push cutting edge technologies. Fast turn-around times (working 3-shift, 7-day operations) will be part of any surviving company's future. Building complex, demanding tooling, right the first time regardless of engineering changes while guaranteeing the quality of the tool and workmanship will also form the foundation for any MTDM shop that will exist in the Windsor Essex 3-5 years from now.

**Problem (95%)**

35. What tools do we need to be successful in the future?

**Observation/Solution**

Staying on the cutting-edge of R&D is the key and the Federal and Provincial governments understand that by offering programs such as IRAP. Companies need to utilise these supports. Only a very small percentage of Windsor Essex companies are using these mechanisms to their potential. Interestingly, those who do use such programs are among the most profitable in the industry.

**Problem (90%)**

36. What do I do next?

**Observation/Solution**

Engage yourself and your shop in the process of moving forward by taking part in seminars, workshops and programs offered as a result of this study and other initiatives being undertaken in this market.

**Problem (60%)**

37. I'm only a small shop; I've mortgaged my home to get the business running, now things don't look good. What do I do?

**Observation/Solution**

You've got some tough decisions to make, and you can't afford to fool yourself that everything will be OK. If you're not bringing the work in directly, you need to network and form partnerships with other companies in the area by leveraging associations like CAMM and CTMA. Believe it or not, some shops are turning away business right now because they can't do it themselves and they don't know who has available capacity that can do the job well. We will work to match-make these companies where we can based on capabilities. Your Detroit-3 automotive business should make up no more than 35% of your business and be balanced with more profitable work.

***Problem (80%)***

38. How do I justify the need for new equipment and technology to my lender?

***Observation/Solution***

Many lenders do not understand the MTDM industry. We must find a way to work more closely together with them. Lenders are looking mainly at financials, cash flow and covenants in isolation, missing what owners and shop operators see as the big picture. As we all know, lenders don't like risk, so to deal with that concern you need to develop a credible track record.

To develop a track record, consider the following: If you require equipment for a specific job or niche that others have and you don't, the lender would prefer to see you lease time on the equipment at an external company. As you demonstrate increasing need over time for this equipment to remain competitive, your lender will likely be supportive. Once you've developed a track record with the lender, you can then move on to the next level; acquiring or developing leading edge technology and unique processes. Engaging lenders in cooperation between companies by suggesting machinery in another shop be used may help move toward this strategy.

Being involved with IRAP and SR&ED programs are important elements. Doing so will minimize the risk in the lender's view and lead to approval of an investment request (while improving your profitability).

*"The Prime objective of a tooling house has been 'to build tools'. It should be ...to make a profit!!" - Sandy Munro*

## 6. CERTIFICATIONS / REQUIREMENTS

Specific industry certifications are perceived to be a large barrier to entry to new industries e.g. aerospace. If the supplier is a tier 2 or below, *they are **not required** to carry the industry certification, although it is **preferred** that they do.*

If a company is a Tier 1 supplier, they are required to carry the certification for the end industry and ensure that suppliers' parts comply with regulations and standards both in terms of ISO and other relevant certifications. For example, if a local MTDM shop was a Tier 1 supplier to the aerospace industry, and utilized local Tier 2 suppliers, the Tier 1 supplier is responsible for ensuring that the Tier 2 shop complies with regulations and standards.

The information below is intended as an overview and a primer of the different registrations of the areas that most likely impact the MTDM Industry. It is not meant to be a comprehensive list as there are 43 different ISO categories.

**QS 9000** *Obsolete*

**ISO 9001:2000** *Current Quality Management Standard.*

Focus is on:

- Reduced variation in work practices
- Clear standardized work instructions
- Enhanced intra- and inter-departmental standards
- Practical metrics that reflect progress
- Reduced operational costs
- Error prevention
- Reduced liability exposure and cost
- Top management commitment and support

**ISO/TS 1649:2002** *Automotive Standard*

Key points:

- Is built on ISO 9001:2000 standards.
- Technical specifications can be obtained via ANSI or [www.AIAG.org](http://www.AIAG.org)
- Frequently referred to as TS-2

**ISO 13485:2003** *Medical Device Manufacturers*

Key points:

- This standard was *written as a model to meet the quality system requirements of various global regulations.*
- Does not emphasize customer satisfaction as it was written as a model for regulatory requirements.
- If a company meets ISO 13485:2003 requirements, it should easily meet FDA QSR requirements
- Risk management is a key element of ISO 13485:2003.
- TR 14969 is a guidance document for the use & implementation of ISO 13485:2003.
- ISO 13485:2003 is a tool for maintaining processes, not for business improvement.

- Unlike ISO 9001:2000, ISO13485:2003 does not allow manufacturers to rationalize documentation.

**AS9100** *Aerospace Quality Management Standard*

Key points:

- AS9100 is based on ISO 9001:2000 and includes an additional 100 requirements referring specifically to aerospace.
- AS9100 supports the FAA's FAR<sup>iii</sup> Title 14 Part 21 requirements.
- Covers design, development production, installation and servicing as well purchasing validation and shipping.
- Variation to key characteristics of a product must be managed for fit, performance, service life and manufacturability.
- Emphasizes planning for in-process verification when a product can't be verified at a later point. Tooling design must also be used to ensure that process data will be captured.
- Design outputs are used to provide identification of key characteristics.
- Provides information on documentation, testing and results.
- Includes additional expectations for supplier approval and management.
- Inspection, validation and acceptance of products from suppliers are addressed. Whether managed on-site or by the supplier(s), the process and controls must be managed by the system.
- Each supplier is responsible for managing its sub-tier suppliers, including source requirements, critical processes and its sub-tier suppliers.
- Addresses engineering requirements, testing samples, and access and inspection of suppliers' facilities.

**AS9110**

Key points:

- The standard for maintenance organizations that work in aerospace.
- Assures that aerospace products are maintained for stringent conditions where repairs can be difficult and endurance is essential.
- Focuses on controls and maintenance plans, configurations and the qualifications needed to perform maintenance.

**AS9120**

- Applies to quality management systems for distributors who regularly stock aerospace commodity items.

**ISO 20000:2005** *Standard for IT service*

**ISO 22000:2005** *Standard for food manufacturers*

Key points:

- Designed to ensure safe food supply chains worldwide.
- Intended to be compatible with the current tools for food safety management including ISO 9001:2000 and Codex HACCP (Hazard Analysis and Critical Control Point).
- Standardizes 20 different national standards and is backed by international consensus.

**ISO27001:2005** *Information Technology, Security Techniques, Information Security Management Systems.*

**ISO14001** **Environmental Standard**

Key points:

- Environmental Policy
- Planning
- Implementation and Operations
- Checking and Corrective Action
- Management Review.

**RC14001** **Responsible Care**

Key points:

- Created by the American Chemistry Council (ACC) to create products that improve lives, uses processes that do not harm the environment, safety, health and security.
- RCMS (Responsible Care Management System) focuses on product stewardship, stakeholder outreach, environmental, health, safety and security.
- Combines RCMS standard with ISO14001.

For Medical devices, all companies, including suppliers must be ISO 9001:2000 certified at a minimum. Beyond that, certification depends on the level and risk to do harm. For example, cabinetry and dispensing equipment is generally classified by the **FDA** as **Level 1** and requires a limited review of the product design (the FDA may or may not choose to review a company at this level). **FDA Level 2** approval is much more serious and may involve critical care. **FDA Level 3** approval is critical and covers implants and things such as insulin pumps, or something that could kill a person if it failed, or operated improperly. In each of these cases, the final OEM will have ISO 13485:2003. The lower tier suppliers can supply with only ISO9001:2000. As the level of seriousness of the application increases, traceability in the manufacturing process becomes more and more critical. **Do you need ISO 13485:2003 certification to produce for a Medical Device company? The short answer is frequently no.**

Conversely, **ASTM certification** (on pressure vessels, nuclear power applications, etc.) is a requirement and *any welding or repair of parts that operate under pressure require both certification and processing by a certified individual (welder) who holds a specific license or a ticket (as it is frequently referred to within the industry) that allows him to do the work.* Different levels of complexity require progressively higher levels of skills and different certifications and licenses.

## 7. CURRENCIES, ILL-WINDS AND OPPORTUNITIES

Windsor Essex based companies, because of their close proximity to Detroit and the US, count their US customers as the largest part of their business. Most companies do 90% or more of their business with US companies and while this was a windfall during the days of a devalued Canadian dollar, it has been a challenge to adapt to an appreciating Canadian currency. We have seen a 70% **appreciation of the Canadian dollar against the US** (from its low on Aug. 27, 1998, to its recent high on November 08, 2007) **in 9 years**. Details of both the fall of the US dollar and rise of the Canadian dollar can be seen on page 26.

Interestingly, the Euro has appreciated in a similar fashion against the US dollar. This can be seen on the graph on page 27, which shows the US dollar compared to the Euro.

The graph on page 28 which charts the value of the Euro vs. the Canadian dollar is eye-opening and illustrates that the best opportunity for new sales and market expansion for companies based in Windsor Essex is **Europe**. Even with a 70% rise of the Canadian dollar against the US dollar, Canada remains competitive in terms of currency and is a preferred country for European companies to do business.

It is important to note that the Europeans believe that as desirable as Canada is, and despite its abundance of natural resources and fiscal prudence, the value of the Canadian dollar will not rise excessively against the US dollar. It is not seen as a viable alternative as a replacement for either the US dollar or the Euro. Its second tier status will keep it a lower cost currency and good place to do business as long as labour rates remain on the current track.

Current fully burdened shop rates in Europe typically range from C\$70-\$159/hour with an average cost of C\$103/hour vs. an average cost of C\$75/hour in Windsor Essex with a range of C\$65-\$85/hour<sup>iv</sup> and working only 188 days vs. a standard 233 working days in Canada. **The 45 additional working days alone, represent a significant advantage if fully utilized on a 2 or 3 shift basis** at a base rate.

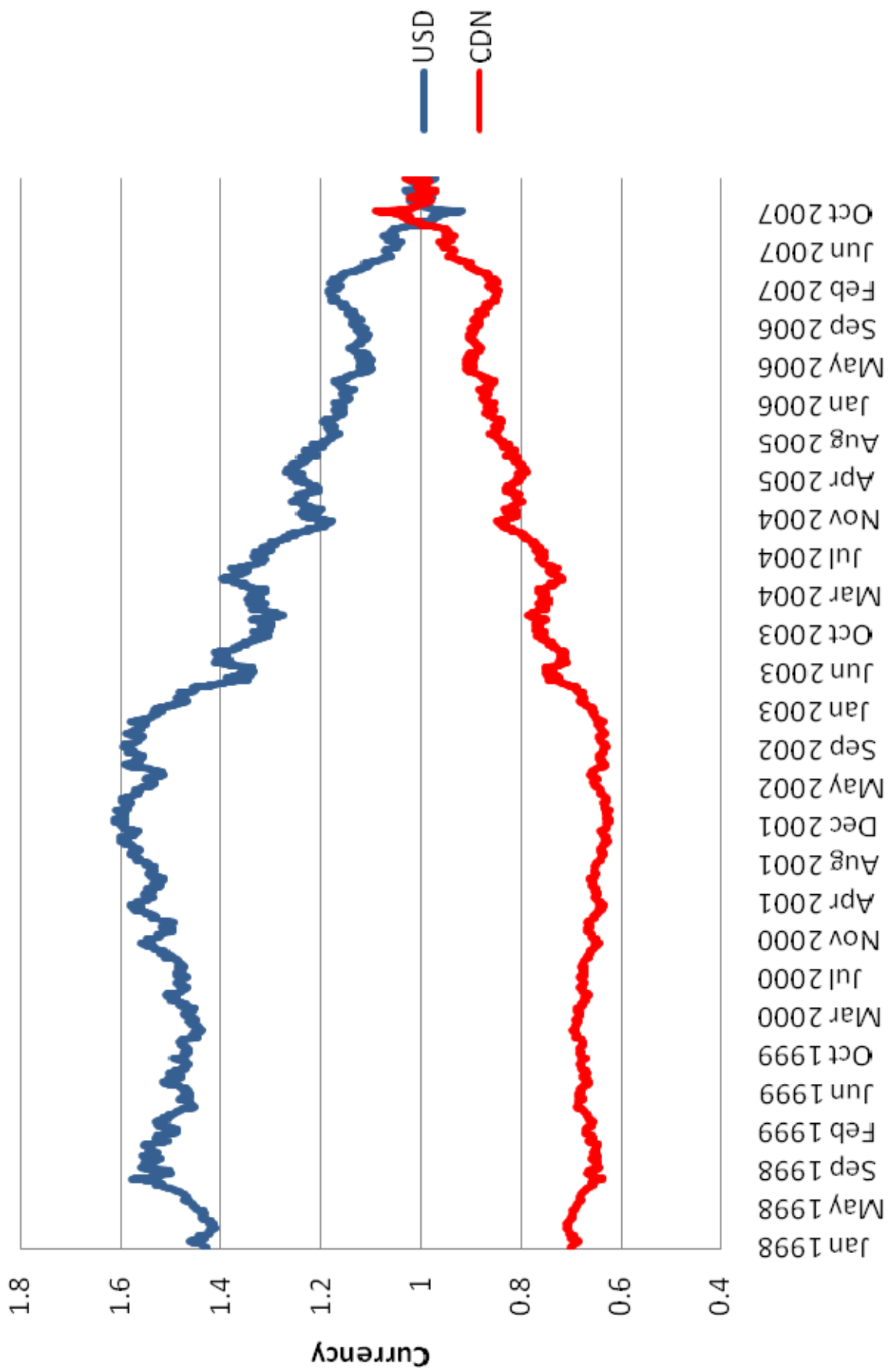
Given that many of the 'advanced' European countries such as Germany and France legislate a 35-hour work week and a maximum number of hours/year that people can work, the 45 day advantage that the Windsor Essex region has over those European countries is actually closer to a 100-day advantage as the overtime rates in Canada are significantly less costly.

There are a variety of reasons that form the base of this preference in the minds of the Europeans including: historical ties; more recent and relatively large immigrant population of European extraction (versus US); social differences (the US is a melting pot vs. Canada that tends to embrace multiculturalism); as well as business barriers in the US such as Sarbanes-Oxley. Canada is also '*perceived*' as a country that is more similar to European countries and therefore, '*perceived*' as an easier place to do business. The final advantage in Canada's favour is the Canadian legal system which is seen as less onerous than the US system.

The challenge for Windsor Essex based MTDM firms is to become visible in global markets where opportunities exist. At present, our region and our firms are not present on the European 'radar'.

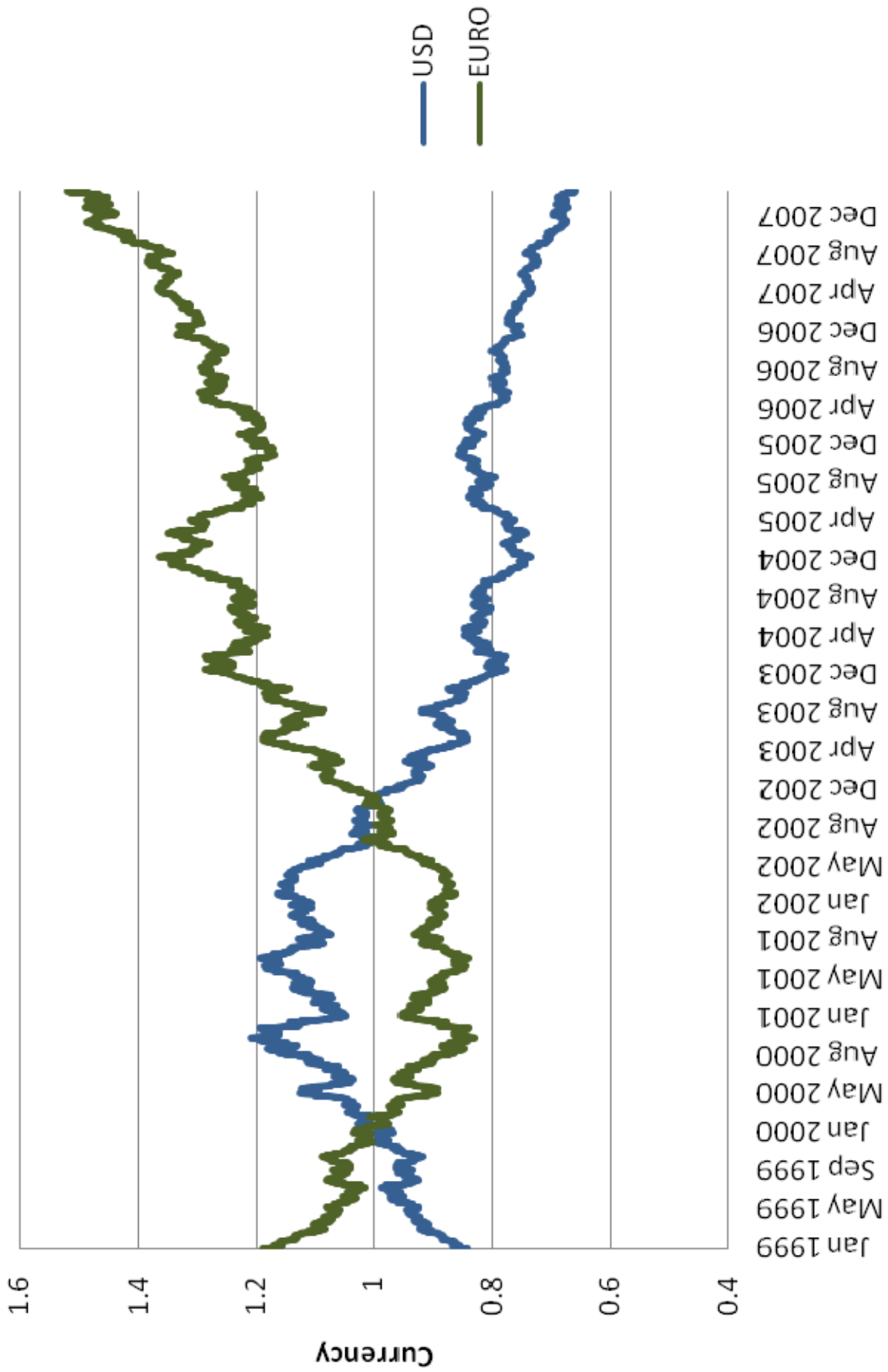
# CDN VS USD

Source: <http://www.bankofcanada.ca>



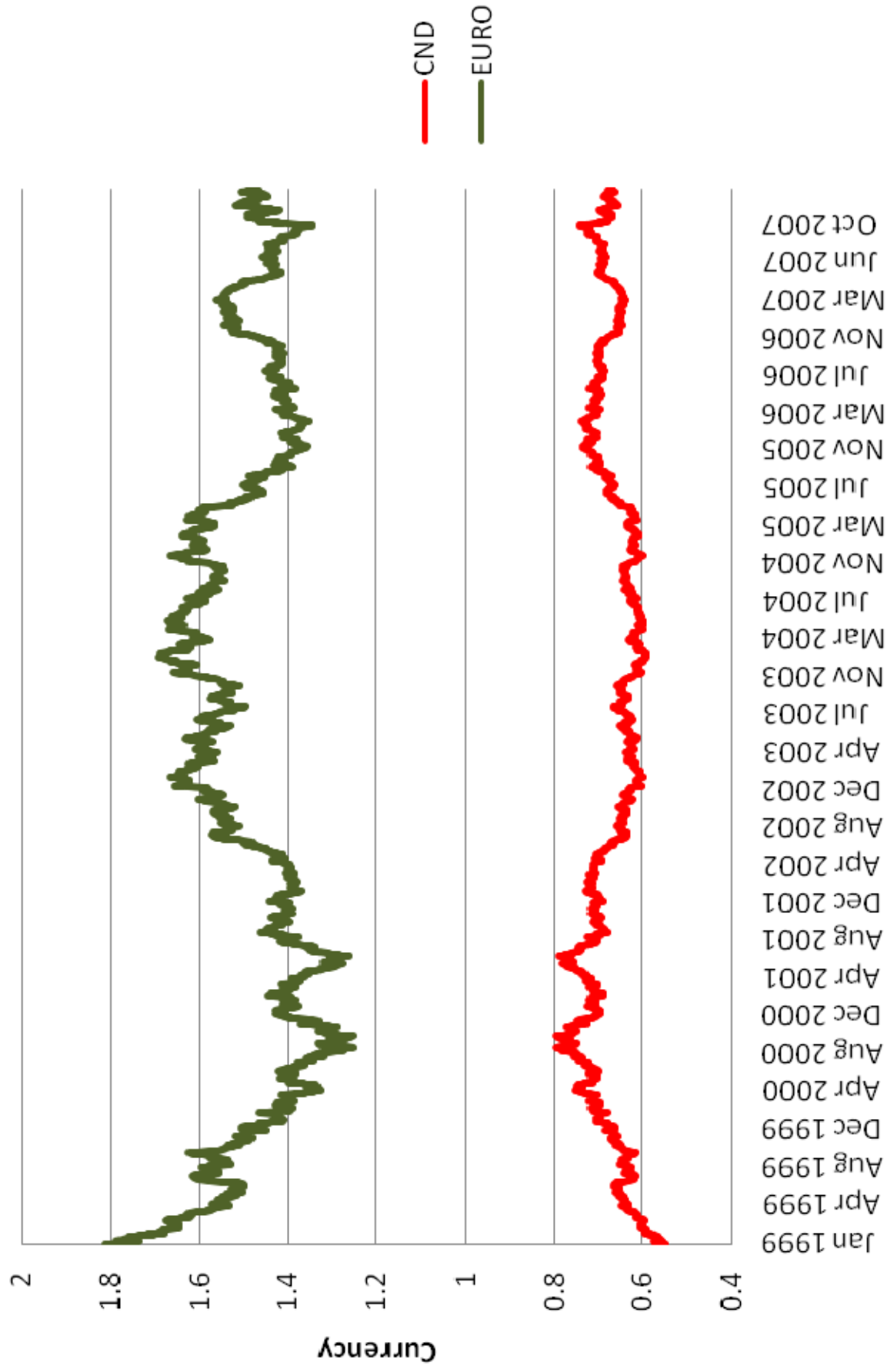
# USD VS EURO

Source: <http://www.bankofcanada.ca>



# CND VS EURO

Source: <http://www.bankofcanada.ca>



## 8. THE OPPORTUNITIES ABROAD

During a European business trip (February – March 2008) Mr. Sandy Munro, CEO of Munro & Associates, Inc. met and spoke with a number of European Senior Executives who were totally unaware of the MTDM capabilities of the Windsor Essex Region. Mr. Munro met with:

- The Board of EADS (the company that owns Airbus, Eurocopter, etc);
- VW VP's at their HQ in Wolfsburg;
- Munro & Associates European Managing Director, Mark Limage, regarding the ongoing work being done with Bentley Motor Car Co., Rolls Royce Jet Engine, Cummins Power Generation and others.

He also visited with the Executive of the **FrankfurtRheinMain GmbH International Marketing of the Region** and gave two speeches regarding efficiency of product design and its influence on innovation, growth and profitability in Madrid, Spain and then again in Darmstadt, Germany followed by talks with the IHK (Industrie-und Handelskammer – Frankfurt am Main Chamber of Commerce and Industry).

The main opportunities that Mr. Munro identified in Europe were with the European Automotive and Aircraft industries, both of which are booming.

Unlike the Canadian and US automotive companies, the Europeans are seeing steady sales and relatively minor influence from foreign imports. The tooling companies visited and interviewed in Germany are very busy. The German OEMs advised that they are worried about a lack of tooling capacity in Europe, Germany in particular.

VW is planning to build a facility somewhere in North America (Mexico was the most favoured location at the time of the visit) but regardless of the North American location, they will need tools of all types. Windsor Essex should be promoting their capabilities to VW.

Our recommendation is that Windsor Essex firms in conjunction with CAMM, CTMA and the WEDC, under the guidance of Munro & Associates, Inc., start a sales and marketing campaign *immediately* in Wolfsburg.

VW advised that they have purchased tooling from some of the lower cost countries, specifically China, and were very disappointed with the results. ***VW tracks the total accounting cost of the dies, molds and machine tools they purchase.*** They also calculate the costs of any downtime and cost of quality (CoQ) against their tooling buys whether they are European, North American or Chinese providing an accurate reflection of true costs incurred.

The forthcoming MEDT cost comparison study of tooling purchases for China vs. Ontario, should be utilized as the central focus of a marketing campaign to promote Windsor Essex tool shops to the North American manufacturing companies. The rationale is to educate the North American OEMs that the cost of the mold, die or machine tool may be the cheapest part of the project if the internal costs associated with poor quality; downtime, repairs, etc are excessive. This case study scenario should be a compelling assessment of the best buying practices for a total accounting cost.

The most shocking part of the trip was discovering that little or nothing is known about the Windsor Essex area and the capability of MTDM industry in our region within the countries visited.

Tooling organizations from California to Toronto are well known but Windsor Essex is not. It appears that Windsor Essex doesn't promote itself in this target rich, highly desirable manufacturing area. Windsor Essex should have a presence that will showcase every aspect of the quality, value and diversity of the area, stocked with tool shop experts that can answer technical questions at the Frankfurt International Motor Show<sup>v</sup>. The show is the biggest in the world and occurs every two years, alternating with Paris each year due to its size. Cars and the technology that goes into engineering and manufacture of the vehicles are on display at this international exhibition. There are five buildings, each bigger than Cobo Hall in Detroit. It is our belief that Germany should be the starting point to make any headway in Europe, with the next International Motor Show happening in Frankfurt in September of 2009.

A complaint that was repeated across Western Europe was that some of the large areas like Southern California had representatives that could only talk in generalities and the *Europeans like technical specifics and data*.

To market successfully to European firms, technical knowhow **and** a grasp of languages like German, French and Italian are necessary to ensure long-term success. The diversity of Windsor Essex and the advantage that it carries for us could have a huge impact if leveraged. Windsor Essex must start to promote on a significant scale to ensure that they get their fair share of this vast market.

Dr. Hartmut Schwesinger is the International Managing Director for the Region of FrankfurtRheinMain. Marketing and networking are his prime concerns. This gentleman is very well known and very powerful from a worldwide networking standpoint. After one of Munro's speeches, Dr. Schwesinger invited him to dinner, and then a second dinner at Schwesinger's home. During that evening, Munro was also introduced to both Mrs. Schwesinger, who is a PhD and well connected in the world of finance, and Mrs. Quant, owner of BMW.

Munro has invited both Dr. Schwessinger and Mrs. Quant to visit Windsor and stay at his home in Canada. Such a visit would be an excellent opportunity for Windsor Essex to showcase what we have to offer. Munro suggests a private dinner at his home, followed by the region hosting these guests at a few key functions.

The largest potential for industry diversity lies within the Aircraft industry. Meetings with the Board at EADS went better than anticipated. A one-hour time slot turned into two full days of meetings complete with two formal dinners. The European way of doing business is very different compared to the North American way; to them relationships are extremely important. Munro was allowed to view their plans and also where there are gaps in their ability to complete those plans. Key to those successes will be credible tooling suppliers who are knowledgeable about composite and HSM (High Strength Materials) parts.

While attending the meetings EADS discovered that they won the recent award for the US Air Force KC-45 Refuelling Tanker Plane. The Airbus/Northrop Grumman contract is worth \$40 Billion initially & \$100 Billion in follow-on orders.

The KC-45A Tanker aircraft will be assembled at new, state-of-the-art manufacturing facilities in Mobile, AL and will employ 25,000 workers at 230 U.S. companies. The KC-45A's refuelling systems will be built at new facilities in Bridgeport, WV and delivered to the KC-45A Production Center for aircraft integration.

The KC-45A will be built by a world-class industrial team led by Northrop Grumman, and includes primary subcontractor EADS North America and General Electric Aviation, Sergeant Fletcher, Honeywell, Parker, AAR Cargo Systems, Telephonics and Knight Aerospace. These companies need Canadian Industrial Regional Benefit Credits and highly skilled craftsmen to build product at a very competitive prices. There is a very real opportunity for local MTDM shops to bid for work on this project at the Tier 2 and 3 levels. We recommend shops wishing to supply the aircraft industry undertake the certification process.

Without investing in advanced engineering the tool companies suffer from the “fast up front... die in the end syndrome”. Engineering is not the spot to rush through to “get into the shop fast”. Most Europeans have figured out that great engineering will keep them ahead of the low-priced foreign competition. This is the key reason that German tool shops have backorders and are expanding into the US market even though the Euro is 50% more expensive than the US or Canadian dollar. Engineering and innovation go hand in hand. We must embrace both of those pillars to succeed going forward.

## 9. OPPORTUNITIES AT HOME

Domestically, opportunities that exist in the oil sands (Alberta) are obvious in terms of heavy fabrication, tooling, fixtures and support. In aviation, (domestically) opportunities exist with Boeing and in the General Aviation (GA) replacement part business as tier 2 suppliers. For more detail see page Germany44.

To track these opportunities, Windsor Essex companies need to join the appropriate Provincial Industry Association (i.e. OAC, TAMA for networking and work opportunities) as well as being active both in those associations and in CAMM, CTMA or the CMTDMF speaking with one voice about needs and concerns within the industry.

58% of the value-added work on the 179 KC-45A tanker (modified Airbus A-330) that has been contracted by the combined US Air Force, Navy, and Marines will be done in the United States by pre-approved suppliers. A significant amount of tier 2 work remains to be assigned by these companies and no tooling or fixturing for the modifications required by the US military currently exists.

Cardinal Health care currently has 3 distinct medium-volume (approximately 100 units/week) medical supply units being redesigned at Munro & Associates, Inc. and each of those units will require new tooling and fixturing opening a door for some suppliers in medical equipment. Molds, dies, and fixturing of parts on all of these programs will be required.

There are more opportunities that will be forthcoming in the next few months and the goal is to give all capable companies exposure. Learning new skills, developing new tools and elevating the company's ability will be key metrics to determine if they can advance even further and accomplish a paradigm shift in their client base.

## 10. CHINA AND UNFAIR COMPETITION

***“China has an active R&D program too...they Rip off & Duplicate, with no concern regarding intellectual property rights...”*** Horst Schmidt

This section of the report deals in more detail with concerns regarding China and other ‘low cost’ locations. China has gone from having a few dozen tool shops in the 1960’s (mostly in Kowloon) to over 30,000 tool shops spread across China today. In its formal **‘2020 Plan’**, China identifies the MTDM industry as one it wants to dominate on a global basis.

To regain our dominant global position, we need to change the rules of the game to change the paradigm.

The WEDC in conjunction with CAMM, CTMA, and the CMTDMF representing the MTDM industry need to speak with one voice and effectively lobby the Canadian Government on a number of issues; including on-going and specific job training; support for reduced shared hours as transition begins to take place in the industry and new clients and customers are developed; education and training funding for advanced methodology; software integration; marketing education/training; and new business development training and support.

The greatest benefit of speaking with one voice is dealing with the issue of dumping and unfair competition from China, Korea, Taiwan and India, and soon Brazil, Russia, Spain, Portugal and other Eastern Bloc countries. The Region needs to speak with one clear voice urging the Government to take action to end the unfair trade practices and dumping that continues to take place. It would also be extremely effective if both the Canadian and American MTDM Industries were to join together and address the issue with the same objectives at the same time. Given the opportunity to form a critical mass and effectively lobby both in Canada and in the United States, there is a rare window to impact a reverse a number of trends which have negatively impacted the industry.

As an immediate fix to part of the industry’s woes, it should be suggested to the OEMs at the Senior Executive level that tools that are not made correctly be back charged for corrective action to their *source*. Such actions would bring a new focus to *‘real costs’* and *‘real lead-times’* in program launches. Taking such action would markedly improve the bottom line at the Detroit-3 (which is why they would entertain the idea) as it would shift the cost from one that they absorb, to one that they pass back to the supplier who generated the problem. This is not doable in the event of engineering changes, but can be used against flawed tools.

A second action that needs to be taken is to document dumping of tools (i.e. the selling of tools below their true cost). We know in a number of cases that the tool being sold does not fairly price the steel in the tool. In other cases, subsidies delivered in a variety of ways unfairly subsidize the foreign tool maker. Those subsidies can come in the form of a rebate from the government on exports, to non-payment or rebating of energy bills. However, if dumping can be proven, countermeasures can be invoked.

As part of its leverage, MTDM companies have an opportunity to take on the PPAP issue. The MTDM industry must accept some blame for this as they have allowed the OEMs to engage in this type of discriminatory behaviour. The building trades and other OEM suppliers get paid in 30 days, but

because of a variety of reasons (perhaps the MTDM sector are poor negotiators, or desperate for work) tool shops have allowed themselves to get into this expensive and awkward position.

The Detroit 3 OEMs, in the purchasing of MTDM parts/products have collaborated and instituted an unfair trade practice. It is not feasible to have smaller supplier companies such as the MTDM subsidize the OEMs. This is an area where both the US and Canadian governments should be lobbied to join forces and implement trade agreements similar to the Federal Government's and the European's which would provide payment 30 days after the tool is signed off by the OEM. If the OEM does not pay in a reasonable amount of time, some sort of action should be taken against the Automotive OEMs, especially those that import tooling into North America.

Munro has confirmed with Mike Tracy of The Agile Group that it is common business practice for the Detroit 3 to pay the Chinese suppliers after sign off and before the product is shipped to North America. If there is any payment at PPAP, it is negligible. Mr. Tracy has also told Munro that his MTDM clients in Mexico say they will only do business with the Oriental and European car companies.

## 11. CONCLUSIONS

There will be further contraction of the MTDM sector in Windsor Essex over the next 3 – 5 years, with the additional loss of 18 – 25 shops, for a variety of reasons from bankruptcies and reorganization at the tier 1 level, cash flow and lack of succession planning or action.

Government intervention in the form of funding, rebates, tax incentives and training are required to preserve what is left of the industry. The MTDM sector represents approximately 240 shops in Windsor Essex and C\$2.1 Billion in economic activity. With the multiplier effect, the loss of economic activity to this sector would be approximately C\$10.5 billion. Additionally, there must be recognition from the Ontario government to acknowledge and implement ongoing training for staff members still employed, rather than focusing solely on those already on unemployment insurance or social assistance.

There is a lack of understanding about Industrial Regional Benefits (IRBs) among shops, local government bodies and the industry associations. Companies do not know how to identify the IRBs or access the opportunity presented by these contracts to Canadian suppliers.

There is little to no visibility of Windsor Essex on the global radar for skills, services and tooling available in this area. There has been no concerted marketing effort to any group or sector, whether regional, by industry, or by municipality. There is a lack of a regional strategy for marketing to areas outside of our “usual” circle, specifically Michigan and parts of the United States. There has been a lack of coordination of efforts, message and positioning on a global scale, leaving Windsor Essex far out of the running for work from other countries, particularly in Europe.

Many shops are guessing at what they need to charge for their tooling in order to be profitable. They generally work on historical data or educated guesses. There is a continuous struggle with work scheduling, process flow and workflow through the majority of shops. Additionally, companies are operating in survival mode and not being proactive with any type of planning. They do not have business plans except to satisfy a lender, and do not follow a plan to maintain, grow, or exit their business.

Most local businesses are not taking full advantage of key Federal and Provincial programs to support their R & D efforts. Those who are reside among the region’s most profitable.

As part of their strategy to outsource to lower cost economies, OEMs are purchasing tooling from ‘new’ economies like China and India. The tooling is frequently flawed in design or in finish, and is repaired in North America prior to being deployed. Repair charges do not appear to be figured in to the OEMs’ calculations for total accounting cost of any given tool, and are not currently back charged to the source.

As well, North American toolmakers are faced with the issue of PPAP, which requires local shops to wait 18 – 24 months for payment and the same rules are not applied to imported tools. This constitutes at best an unfair trade practice, and at worst dumping.

The WEDC does not have a good way of accessing information about local shops to make recommendations or capitalize on network opportunities because the data is not collected, or easily accessible. This is a requirement going forward to make the most of every contact with every firm.

There is limited uptake and understanding of lean principles throughout shops across the region, from both design and manufacturing standpoints. The lack of knowledge and lack of implementation about this process has bred some contempt among shops for the value or realistic expectations of what lean can do for an organization.

Windsor Essex manufacturers have remained loyal to the automotive industry, while that industry has not done the same in return. Many shops are above 90% dependent on the automotive industry; a dangerous predicament to be in. Shops should have no more than 35% of their work dependent on the Detroit 3. They have not undertaken or understood the importance of serious diversification efforts, including understanding certifications, inroads, networks and industry associations that can be of benefit to them in this effort.

Recently the Ministry of Economic Development and Trade branch of the Ontario government announced support for the MTDM sector to the tune of \$1.6 million dollars to fund both the APMA and CTMA in support of programs to support competitiveness and software investigation. Additionally, the Ontario Budget pledged \$50 million in support for the following two programs: 25 million for employer-based training in the manufacturing sector through the Yves Landry Foundation and \$25 million for productivity enhancement investment for small and medium sized businesses to be administered by the CME.

## 12. RECOMMENDATIONS

1. WEDC to deliver detailed information on IRBs to the industry, including identifying companies with outstanding IRBs and how to access these as a tool to bid for work. This will require additional market research and intelligence to be performed in addition to the information presented in this study.
2. WEDC to develop a searchable database from the survey data gathered from local MTDM shops by Munro & Associates.
3. WEDC to engage the OAC for opportunities within the Ontario Aerospace and Canadian Aerospace sectors that will be of benefit to Windsor Essex companies.
4. WEDC to research and engage the Trillium Medical Technology Association (TMTA) and the Association of Ontario Medical Manufacturers (AOMM) to understand and deliver opportunities within the medical manufacturing sector that will be of benefit to Windsor Essex companies.
5. Munro & Associates to deliver a workshop regarding work scheduling, process flow and quoting to Windsor Essex manufacturers at the earliest opportunity.
6. Munro & Associates to deliver workshops regarding Lean Design® and the stages within this process to help understand cost metrics, the value of increased standardization and reduction of inventory carrying costs at the earliest opportunity. As well, sessions in job costing and quoting effectively will be required. Further work is required in process flow and scheduling.
7. Industry associations should encourage the development of a common central use financial group to assist with quotes, accounting, H.R. and personnel issues for a group or groups of companies.
8. Industry associations should perform and deliver extensive market research and intelligence to leverage new opportunities in alternative markets such as Europe, the Asia's, and new market segments such as aerospace and medical manufacturing.
9. Munro & Associates to develop an intensive and effective business course or series of workshops to be offered to the management and senior executives/owners of local MTDM shops to help them move forward with clear strategic business and marketing objectives. It is possible that this content could be delivered by the Odette School of Business through the University of Windsor in a condensed, accelerated fashion.
10. WEDC in cooperation with the industry associations must lobby the Detroit 3 automotive OEMs to back charge suppliers for corrective action required on imported tools.

11. There are several key initiatives that WEDC can address by lobbying the government in partnership with industry associations, such as: specific job training support as well as education and training funding for advanced methodology extending to currently employed individuals rather than only those who qualify for employment insurance; anti-dumping legislation for low-cost economies; and elimination or modification of PPAP legislation.
12. WEDC in conjunction with industry associations, Munro & Associates and several key MTDM shops to exhibit and participate in international trade fairs, specifically Farnborough International Airshow in England, and Frankfurt International Motor Show in Germany. Failure to attend these two key shows will seriously hurt the efforts to gain entry to the markets.
13. WEDC in conjunction with industry associations and key MTDM shops to engage a professional marketing agency to develop a regional message and deliver content, opportunities and ability to leverage new markets. This resource can also help to plan attendance at international and domestic trade shows of critical importance to this industry. This marketing campaign should be rolled out in Germany (specifically Wolfsburg and FrankfurtRheinMain GmbH in the initial phase).
14. WEDC to deliver information on specific industry certifications and their application to new markets, specifically at the tier levels for entry.
15. Through Munro & Associates, WEDC should engage key contacts Dr. Schwesinger of Frankfurt RheinMain and Mrs. Quant of BMW, hosting these individuals in the region and encouraging them to attend key functions as well as plant tours.
16. The opportunities in Appendix 1 should be researched and distributed to local MTDM shops.

# APPENDIX 1

The KC-45A aircraft purchase is a windfall for North American suppliers. Until now, airbus has been unable to penetrate the US market which had been dominated by Boeing and Lockheed Martin. These purchases for 179, KC-45A tankers (which are modified Airbus A-330 aircraft) will benefit 25,000 American workers at 230 US companies based in 49 states. Total purchase price to the US Air Force, is \$40 Billion US funds with 58% of that total amount directly benefiting US based companies. The States with the highest benefits are:

ALABAMA  
ARIZONA  
ARKANSAS  
CALIFORNIA  
FLORIDA  
GEORGIA  
ILLINOIS  
INDIANA  
LOUISIANA  
MARYLAND  
MICHIGAN  
MISSISSIPPI  
NEW MEXICO  
NORTH CAROLINA  
OHIO  
PENNSYLVANIA  
TENNESSEE  
TEXAS  
VIRGINIA  
WEST VIRGINA

The following is a breakdown of companies by state that have been approved as suppliers.

## ALABAMA

Engelhard (BASF), Huntsville, Ala. -- Ozone Converter  
GKN-Westland Aero, Tallassee, Ala. -- Wing Panels  
PPG Industries, Huntsville, Ala. -- Windshield & Glass  
EADS NAT, Mobile, Ala. -- A330 Assembly  
Goodrich Aerospace, Foley, Ala. -- Engine Sub-Assemblies  
Northrop Grumman Technical Services, Mobile, Ala. -- Program Support.

## ARIZONA

Goodrich Corporation; Phoenix  
Honeywell, Phoenix, Tempe, Tucson, Ariz.  
L3 Communications; Phoenix  
American Aerospace Tech Castings; Phoenix  
Intec EDM, Tempe, Ariz.  
Parker Seal - CSS Division; Tempe, Ariz.

## ARKANSAS

Triumph Fabrications; Hot Springs, Arkansas

## CALIFORNIA

Alcoa; Torrance, Calif.  
Barry Controls; Burbank, Calif.  
Circle Seal Controls; Corona, Calif.  
Meggitt Safety Systems, Inc.; Simi Valley, Calif.  
Pacific Scientific; Duarte, Calif.  
Teledyne; Los Angeles  
ACRA Aerospace; Anaheim, Calif.  
Air Master Production Corp.; Chatsworth, Calif.  
Ametec Aerospace; Costa Mesa, Calif.  
Avibank Manufacturing Inc.; North Hollywood, Calif.  
Carlton Forge Works; Paramount, Calif.  
Cast Parts Inc.; City of Industry, Calif.  
City Wire Cloth; Fontana, Calif.  
Eaton Aerospace; Los Angeles  
GKN Aerospace Chemtronics; El Cajon, Calif.  
Goodrich Aerostructures Group; Chula Vista, Calif.  
Hartwell Corporation; Los Angeles  
Hexcel Composites; Dublin, Calif.  
Hi-temp Insulation; Camarillo, Calif.  
Honeywell; Torrance, Calif.  
Independent Forge Company; Orange, Calif.  
ITT Aerospace Controls division; Valencia, Calif.  
Jet Manufacturing; Corona, Calif.  
Kirkhill Rubber Company; Brea, Calif.  
Kirkhill-AT Company; Valencia, Calif.  
Morton Manufacturing; Santa Clarita, Calif.  
Pentacon Aerospace Group; Chatsworth, Calif.  
PSI Bearings; Simi Valley, Calif.  
RBC Transport Dynamics; Santa Ana, Calif.  
Schlosser Forge Company; Rancho Cucamonga, Calif.  
Stillman Seal; Carlsbad, Calif.  
Thermal Structures Inc.; Corona, Calif.  
Transdigm Adelwiggins Group; Los Angeles  
Argo Tech; Costa Mesa, Calif.  
Easterline Mason; Sylmar, Calif.  
KGS; Arcadia, Calif.  
Parker Aerospace; Irvine, Calif.  
Dowkey; Ventura, Calif.  
Fischer Custom Communications; Torrance, Calif.  
Phoenix International; Orange, Calif.  
Synergy Microsystems; San Diego  
Viasat; Carlsbad, Calif.

## FLORIDA

Gables Engineering, Coral Gables, Fla. - Air traffic control panel  
ABA Industries, Pinellas Park, Fla. - Engine subassemblies

Kam Specialties, Pompano Beach, Fla. - Engine subassemblies  
Pall Aeropower Corporation, New Port Richey, Fla. – Engine subassemblies  
L3 Communications, Sarasota, Fla. - Mission recording system  
Smiths Aerospace, Clearwater, Fla. - Flight management system  
EADS, Melbourne, Fla. - Program management and engineering

### **GEORGIA**

Vought, Milledgeville, Ga. - Engine Sub-Assemblies  
Parker Hannifin, Dublin, Ga. - Servo Valves  
RCF Seals, Vidalia, Ga. - Engine Sub-Assemblies  
TIG Hitco, Atlanta, Ga. - Engine Sub-Assemblies  
Millennium Solutions, Chamblee, Ga. - Aircraft Components

### **ILLINOIS**

Hamilton Sundstrand; Rockford, Ill. -- turbine and power generation control units  
Abrasive Form; Bloomington, Ill. -- engine sub-assemblies  
Danville Metal Stamping; Danville, Ill. -- engine sub-assemblies  
NTN Bearing Corp.; Mount Prospect, Ill. -- engine sub-assemblies  
MPC; Skokie, Ill. -- aerial refueling boom components  
Northrop Grumman; Rolling Meadows, Ill. -- LAIRCM

### **INDIANA**

Alcoa; Lafayette, Ind.  
Honeywell; South Bend, Ind.  
BAE Systems; Fort Wayne, Ind.  
L&E Engineering; Greenwood, Ind.  
Morris Machine; Indianapolis, Ind.  
Praxair Surface Technologies; Indianapolis, Ind.  
Reeder & Kline Machine; Carmel, Ind.

### **LOUISIANA**

US Airforce, Maintenance and Support.

### **MARYLAND**

Middle River Aircraft Systems; Baltimore  
Perkinelmer Fluid Sciences; Beltsville, Md.  
Northrop Grumman Electronic Systems; Linthicum, Md.

### **MICHIGAN**

Smiths Aerospace; Grand Rapids, Mich.  
Eaton Aerospace; Grand Rapids and Jackson, Mich.  
Parker Aerospace; Kalamazoo, Mich.  
Barnes Aerospace; Lansing, Mich.  
Flexfab LLC.; Hastings, Mich.  
Howmet Corp.; Whitehall, Mich.  
Moeller Manufacturing; Wixom, Mich.  
Rolled Alloys; Temperance, Mich.

### **MISSISSIPPI**

Northrop Grumman – components & final assembly.  
MTDM Diversification Study

EADS – components & final assembly

**NEW MEXICO**

GE; Albuquerque, N.M. -- CF6 engine sub-assemblies  
Mach2 Machining and Manufacturing; Albuquerque, N.M. -- CF6 engine sub-assemblies  
Sun Country Industries; Albuquerque, N.M. -- CF6 engine sub-assemblies  
Honeywell; Albuquerque, N.M. -- Radio Management Systems

**NORTH CAROLINA**

Alvac, Monroe, N.C. - Titanium  
Cincinnati Thermal Spray, Rocky Point, N.C. - CF6 engine sub-assemblies  
GE Shop-Assembly, Durham, N.C. - CF6 engine sub-assemblies  
GE Shop-Disks, Wilmington, N.C. - CF6 engine sub-assemblies  
Goodrich Corporation, Charlotte, N.C. - computer systems  
AAR Corporation, Goldsboro, N.C. - advanced cargo loading system

**OHIO**

GE; Cincinnati - will provide the CF6 engines  
Goodrich; Troy, Ohio - nose wheel assemblies  
RTI International; Niles, Ohio - will provide titanium  
Barnes Aerospace; West Chester, Ohio - CF6 engine sub-assemblies  
Cincinnati Thermal Spray; Cincinnati - CF6 engine sub-assemblies  
Ferco Tech; Franklin, Ohio - CF6 engine sub-assemblies  
GE Shop - Frames & Shafts; Evendale, Ohio - CF6 engine sub-assemblies  
GE Shop - Tubes; Xenia, Ohio - CF6 engine sub-assemblies  
Graphel Corporation; West Chester, Ohio - CF6 engine sub-assemblies  
Metal Improvement Co.; Blue Ash, Ohio - CF6 engine sub-assemblies  
Ohio Gasket & Shim; Akron, Ohio - CF6 engine sub-assemblies  
Parker Aerospace; Forest, Ohio - CF6 engine sub-assemblies  
PCC - Airfoils Co.; Wickliffe, Ohio - CF6 engine sub-assemblies  
QC Labs; Woodlawn, Ohio - CF6 engine sub-assemblies  
Tool Sales & Service; Cincinnati - CF6 engine sub-assemblies  
TW Metals; Cincinnati - CF6 engine sub-assemblies  
U.S. Aeroteam; Dayton, Ohio - CF6 engine sub-assemblies  
U.S. Chrome Corp.; Dayton, Ohio - CF6 engine sub-assemblies  
Honeywell; Urbana, Ohio - pilot director and marker lights  
Northrop Grumman; Fairborn, Ohio - will provide the training system

**PENNSYLVANIA**

Timet; Morgantown, Pa.  
Carpenter Technology; Reading, Pa.  
SPS Technologies; Jenkintown, Pa.

**TENNESSEE**

Vought Aircraft Industries, Nashville, Tenn. - A330 wing structure  
Aircraft Safety, Memphis, Tenn. - Interior smoke barriers

**TEXAS**

Honeywell; Roanoke, Texas -- CF6 engine sub-assemblies

Texas Almet; Arlington, Texas -- CF6 engine sub-assemblies  
Wyman-Gordon Forgings; Houston, Texas -- CF6 engine castings  
Chelton; Lewisville, Texas -- Radio and IFF antennas  
Knight Aerospace; San Antonio, Texas -- Palletized seating systems

### **VIRGINIA**

EADS; Arlington, Va. - Program management of A330 production in the U.S.  
Mecaero Products; Dulles, Va. - CF6 engine subassemblies  
Airbus Service Center; Ashburn, Va. - A330 service and support  
Euro-Composites Corporation; Elkwood, Va. - CF6 engine subassemblies

### **WEST VIRGINIA**

Alcan; Ravenswood, W.Va.  
Star Technologies; Huntington, W.Va.  
Sargent Fletcher; Bridgeport, W.Va.  
EADS; Bridgeport, W.Va.

The following is a partial list of companies who are seeking suppliers for a variety of aviation programs and will be in Montreal April 7-11, 2008 looking to find qualified suppliers, sources and potential JV opportunities. Munro & Associates, Inc. will be attending this event and has scheduled a number of meetings with people who are looking for specific sources of tooling, dies, and automation.

## **GERMANY**

### **ACTECH GMBH**

#### **GERMANY**

Rapid Prototyping for Sand and Investment castings

### **EADS GMBH**

#### **GERMANY**

Aerospace and defense activities

### **FOOKE GMBH**

#### **GERMANY**

Manufacturer and Supplier of 5 axis high speed machining centers for composites, aluminum, steel

### **SAINT GOBAIN MG SILIKON GMBH**

#### **GERMANY**

Leaders in manufacturing of silicone and fluoro-silicone rubbers seals.

### **SPINNER GMBH**

#### **GERMANY**

SPINNER is the leading European manufacturer of high frequency rotary joints and delivers a large variety of rotary joint combinations according to customer specifications.

## **AUSTRIA**

### **AUSTRIA**

Distributed embedded computing and networking; fault tolerant systems and communication platforms for advanced more electrical aircraft

MTDM Diversification Study

ELECTRONIC APPARATUS NV

## BELGIUM

### BELGIUM

Design & production of printed circuit boards – Assembling of printed circuit boards  
SABCA

### BELGIUM

Aerospace Design Technology and Manufacturing.  
SAINT GOBAIN PERFORMANCE PLASTICS NV

### BELGIUM

Design and manufacture a complete line of standard and custom lip seals

## BRAZIL

EMBRAER

### BRAZIL

Aircraft manufacturer

## CANADA

ACROTURN INDUSTRIES INC

### CANADA

Manufacture a wide variety of landing gear and flight control

AEROSPACE WELDING INC

### CANADA

Repair of aircraft engine and structural components. Manufacturing of mechanical components.  
Sub-assemblies and ground support

ASSYSTEM

### CANADA

Engineering of aeronautical products/processes. Design and production of aeronautical equipment and tools.

AVERNA VISION & ROBOTICS

### CANADA

Design of customized solutions to automate labour intense processes such as De-burring, Polishing, Surface quality and Dimensional Inspection for high precision and complex components.

BEN MOR

### CANADA

Manufacturing of galvanized aircraft cable, stainless steel aircraft cable, coated PVC, nylon and urethane cables, assembly cable, cable and wire rope hardware, wire rope, chain and synthetic web sling

BOEING CANADA TECHNOLOGY WINNIPEG DIVISION

### CANADA

Aircraft manufacturer

BOMBARDIER AERONAUTIQUE

### CANADA

Aircraft manufacturer  
CMC ELECTRONICS, AN ESTERLINE COMPANY

CANADA

Designs and produces leading technology electronics products for the aviation and global positioning markets

DCM AERONAUTIQUE

CANADA

DCM Aerospace is one of the principal manufacturers and designer of aircraft maintenance tooling and ground support equipment in North America

DELASTEK INC

CANADA

Composite parts for aircraft, helicopters - Air intakes for aircraft - Inner cover parts for cockpits - Thermoforming, Acrylic, Poly carbonate, Ultem and others - Contact moulding - RTM – Infusion and land vehicles

DELORO STELLITE INC.

CANADA

Component casting and finishing to your specification in Nickel and Cobalt alloys and super alloys.

HEROUX-DEVTEK INC

CANADA

Design, Qualification, Manufacture, Repair & Overhaul of Landing Gear systems and components.

HISPANO SUIZA CANADA

CANADA

Electronic products in service for the world's major aircraft manufacturers.

HYPERNETICS LIMITED

CANADA

Design and Manufacture precision, state of the art electromagnetic devices, such as wheel speed transducers for aircraft braking systems

L-3 MAS CANADA

CANADA

Systems integration organization specializing in the modernization and maintenance of aircraft

LES METAUX SPECIALISES SAMUEL

CANADA

Aluminum sheets, bars

LUXELL TECHNOLOGIES

CANADA

Design, development, production, test and support of Ruggedized Flat Panel Displays for Aerospace and Defense applications.

MAGELLAN AEROSPACE CORPORATION

CANADA

Aerospace & Defense

MANNARINO SYSTEMS & SOFTWARE INC

CANADA

Engineering R&D firm specializing in systems & embedded software for gas turbine engines and avionics

MECACHROME CANADA

CANADA

Design and manufacture of mechanical assemblies

MECAER AMERICA INC

MTDM Diversification Study

**CANADA**

Mecaer's know-how and expertise in system design and integration offers a wide range of aerospace products and services, such as landing gears, flight controls, hydraulics and actuation, interiors as well as maintenance, repair and overhaul.

MECANICA SOLUTIONS INC

**CANADA**

PLM Products & Services, Engineering Services, Software Services

MELOCHE GROUP INC

**CANADA**

Integrated supplier in value-added mechanical components and assemblies

MESSIER DOWTY INC

**CANADA**

Design, development, test, manufacture, assembly of landing gear

MINICUT INTERNATIONAL INC.

**CANADA**

Mini-cut is specialized in the manufacture of high-precision cutting tools for the aerospace & defense, automotive and metalworking industries. - tooling heat treat surfaces

MSB DESIGN INC

**CANADA**

Engineering, Conception, Manufacturing aircraft interiors

NSE AÉRO NORTH AMERICA INC

**CANADA**

Development and integration of wired electronic systems.

NU TECH

**CANADA**

High precision machining

PRATT & WHITNEY

**CANADA**

Design, manufacture and service of aircraft engines, space propulsion systems and industrial gas turbines

PROCECO LTD.

**CANADA**

Design and manufactures aqueous parts washers, degreasers and precision cleaning systems, high-pressure water de-burring machinery, automated FPI process lines, and surface treatment systems.

ROLLS-ROYCE CANADA LIMITED

**CANADA**

Engines Manufacturer

SIDO LTEE

**CANADA**

Specialized in precision machining of components & subassemblies

SONACA NMF CANADA INC.

**CANADA**

Development, manufacturing, assembly and test of aerospace structures and their associated subsystems

TECHNIPRODEC LTEE

**CANADA**

Proven and technology-intensive machining and assembly techniques - Engineers design high-yield tooling and lost

wax injection moulds

MTDM Diversification Study

THYSSENKRUPP VDM CANADA LTD

**CANADA**

Manufacturing mill of nickel alloy and super alloy semi-finished product for aerospace

TMH CANADA INC

**CANADA**

Aircraft Ground Support Equipment and Maintenance

Tooling Industry

TURBOMECA CANADA

**CANADA**

Leading manufacturer of low- to medium-power gas turbine for helicopters

UNISON ENGINE COMPONENTS

**CANADA**

Mfg. of complex fabricated components, assemblies in various materials for major commercial military aircraft.

## SPAIN

CESA - COMPANIA ESPANOLA SISTEMAS

AERONAUTICOS

**SPAIN**

Design, Qualification, manufacturing, assembly of Aeronautical Systems

SENER INGENIERIA Y SISTEMAS SA (MADRID)

**SPAIN**

Engineering, consultancy and systems integration company

SK 10 ANDALUCÍA S.A. (CCI SEVILLA)

**SPAIN**

Big aeronautical assemblies.

## USA

ACUTEC PRECISION MACHINING INC

**USA**

Turning services, Electro discharge machining EDM services, Electro chemical machining ECM services

AIM INTERNATIONAL

**USA**

Material Solutions for the Maintenance Repair and Overhaul Market

AIRCO INDUSTRIES, INC. DBA PHOTO ETCH

**USA**

Display and control panels, flight simulation and training components

APPLIED AEROSPACE STRUCTURES CORP

**USA**

Complex composite and metal bonded structures

BODYCOTE NORTH AMERICA

**USA**

Bodycote supports high volume manufacturing support test programs and development programs for Aerospace

Industries.

BRALCO METALS

USA

Aluminum, stainless steel and rod metals, in sheet plate, coil and rod bar

CAMTECH PRECISION MANUFACTURING

USA

High speed large scale machining

CESSNA AIRCRAFT COMPANY

USA

Aircraft Manufacturer

ECIDA ASSOCIATION (Commercial Delegation of 4  
Companies)

USA

Erie county industrial development agency

GE AVIATION SYSTEMS

USA

Leading global provider of innovative solutions to builders and operators of military and civil  
aircraft, engines and land vehicles, from large transports to fighters, UAV's to armoured vehicles,  
and from helicopters to regional and business jets

GULFSTREAM

USA

Aircraft Manufacturer

HARBOUR INDUSTRIES

USA

High Temperature and High Performance cable manufacturer

HONEYWELL AEROSPACE

USA

Engines manufacturer

MANOIR SPECIAL FORGING USA

USA

Metal components for airframes, landing gear, engines and fittings for aircraft, helicopters and  
satellite launchers.

MIKROMAT USA

USA

Precision tooling machines

MNB TECHNOLOGIES INC.

USA

High performance reconfigurable computing

NMC GROUP

USA

Light weight aerospace fasteners, clamps, wiring devices, honeycomb inserts, adhesive bonded  
fasteners.

NOW ELECTRONICS INC

USA

Distributor of Electronics Components for Military and aerospace industries

PALL CORPORATION

USA

Filtration and separation systems

PARKER HANNIFIN CORP, HYDRAULIC SYSTEM DIV.

MTDM Diversification Study

## USA

Parker Hannifin Corporation is the world's leading diversified manufacturer of motion and control technologies, providing systematic, precision-engineered solutions for a wide variety of commercial, mobile, industrial and aerospace markets

SECO TOOLS INC. USA

## USA

Machines for drilling, milling

SHAPES AEROSPACE INTERNATIONAL

## USA

Aircraft engine exhaust components aircraft structural components nickel alloy welding & fabrication structural composites.

SPECTRUM AERONAUTICAL

## USA

Very light jet manufacturer

STAR TECHNOLOGIES, LLC

## USA

Manufacturer of precision clamping devices cushion clamps, brackets, and metal stampings

TECT AEROSPACE

## USA

Aerospace machine - Forging manufacturer for engine and aero structure - Assembly

US Commercial Services (Commercial Delegation of 30 companies)

## USA

Support to US companies and promotion of the USA

VERMONT COMPOSITES, INC.

## USA

Design, engineer, and fabricate custom advanced carbon and fibreglass composite structures

WILLIAM INTERNATIONAL

## USA

Development and manufacture of small gas turbine engine technology

## FRANCE

5D INTERNATIONAL

## FRANCE

Medical and Aerospace Global Sourcing Stamping, Fine Turning and Micro-Assembling

ACC LA JONCHERE

## FRANCE

Manufacturing of equipment for industry and aeronautics

ADEL GROUP

## FRANCE

Tier-2 equipment supplier, hardware & software design, industrialization, hardware manufacturing, technical

assistance, consulting, expertise, supply chain, life-through support, obsolescence management

AEROSPACE CLUSTER IN RHONE-ALPES (Commercial Delegation of 10 Companies)

## FRANCE

Aerospace Cluster in Rhone Alps

AEROSPACE VALLEY

## FRANCE

MTDM Diversification Study

World Competitiveness cluster Midi-Pyrenees – Aquitaine on Aeronautics, Space and Embedded Systems

AJILON ENGINEERING ATNI

FRANCE

Consulting and Engineering services for aerospace industries

ALLIO SAS

FRANCE

Design and manufacturing of all types of tools (moulding, trimming, sheet metal forming, machining supports, assembling, control, etc.) for industrialization of aeronautic parts and sub-assemblies (metallic and composite).

AMPHENOL SOCAPEX

FRANCE

Manufacturer of interconnect products in the world

AMR ELECTRONIQUE

FRANCE

Polymerization by heat loss, reeling and carbon composite.

ANTAVIA

FRANCE

Maintenance Repair Overhaul

APPLICATIONS INDUSTRIELLES DES PLASTIQUES (A.I.P)

FRANCE

Plastics processing by machining, injection, thermoforming and boiler making.

ATI ELECTRONIQUE

FRANCE

Manufacturing of connectors for industry, aeronautics, military and space.

ATR

FRANCE

Regional Aircraft Manufacturer

BONNANS

FRANCE

Surface treatment

CHAMBER OF COMMERCE OF SEINE ET MARNE

(Commercial Delegation of 5 Companies)

FRANCE

Commercial Delegation of Seine et Marne (France)

CHATAL SA

FRANCE

Skills in cutting, broaching, grooving and grinding, and now has an additional stock of numerical control turning and milling machinery for aerospace Industries

CINETIC MACHINING

FRANCE

Aluminum parts High Speed Milling Machines for

Aerospace Industries - Laser welding machines – Machine tools refurbishment - Machine tools retooling – Industrial lines transfer and relocation - Electro spindle refurbishment

CIREP SAS

FRANCE

Special printed circuits

CLUSTEXPORT

MTDM Diversification Study

**FRANCE**

Aerospace Cluster Nantes / Saint Nazaire Industries  
CORIMA MODELAGE

**FRANCE**

Manufacturer of electroformed Nickel and/or Copper moulds and technical parts.  
CRCI MIDI PYRENEES (Commercial Delegation of 10 Companies)

**FRANCE**

Commercial Delegation of Midi Pyrenees (France)  
DEFINOX - GROUPE DEFONTAINE

**FRANCE**

Manufacturer of stainless steel valves and accessories  
DETAMPEL

**FRANCE**

Mechanics for civil and defense aerospace (cutting, computer assisted conception, welding)  
DIAMOUTILS-KY DIAMOND

**FRANCE**

Diamond and CBN tool manufacturer  
DRAKA FILECA FOPTICA

**FRANCE**

Electrical & fibre optic wires & cables for on board electronic equipments and electrical power devices

DUFIEUX INDUSTRIE

**FRANCE**

Manufacturer of machine tools  
DUQUEINE COMPOSITES

**FRANCE**

Design and manufacture of parts and subassemblies composite techniques.  
EADS SOGERMA

**FRANCE**

Aircraft interiors and aero structure  
ECM

**FRANCE**

Aeronautical engineering - Design, modeling calculation : Structures, systems, commercial layout  
ELTA-AREVA

**FRANCE**

Electronics for harsh environments  
EPSILON INGÉNIERIE

**FRANCE**

Design Office in heat engineering. Thermal engineering and associated physical phenomena, on-board systems, aeronautics, space.

ESPACE SA

**FRANCE**

Studies Benefits Services in Aeronautical and Control Equipment  
FONDERIE MERCIE EUROPE

**FRANCE**

Light metals foundry  
IMPHY ALLOYS

**FRANCE**

Nickel and cobalt alloys for the following market Composites moulds, Oil and gas, electronics, electrical engineering and electrical safety, Aerospace and automotive  
INDRAERO SIREN SAS

FRANCE

Design and systems, industrialization, complete aeronautical production and integration (structure, equipment and interior fitting)

INFODREAM

FRANCE

SPC software publisher and measurement management

INTESPACE

FRANCE

Environment tests in the space and industrial fields (aeronautics, defense, car manufacturing, etc.).

LABINAL INC

FRANCE

Design and electrical wiring systems for the aviation, space and defense markets

LATECOERE

FRANCE

99% civil aeronautics - 70% aero structures (50% fuselage + 50% floors) - 30% wiring

LE GUELLEC SAS

FRANCE

Manufacturing of metallic tubes and tubular components with high finishing precision. Micro-drilling and production of assemblies and subassemblies for high-tech industries.

MCSA-SIPEM

FRANCE

Machining and aeronautic assembly integration

MECAFI

FRANCE

High precision machining

MESSIER-BUGATTI GROUPE SAFRAN

FRANCE

Systems integrator and high-tech aeronautical equipment manufacturer.

MICROTURBO

FRANCE

MICROTURBO is one of the world leaders in gas turbine applications

PINETTE EMIDÉCAU INDUSTRIES

FRANCE

PEI designs, manufactures and integrates the total moulding, system for development and production equipment for technical and structural composite parts

SAINT GOBAIN PERFORMANCE PLASTICS NV

FRANCE

High performance seals

SAINT GOBAIN SULLY

FRANCE

Worldwide specialist for transportation transparencies

SANDOW TECHNIC

FRANCE

Problem solvers for attachments, suspensions, vibration and shock damping, stowing...

SAS ALEMA

FRANCE

Aero structures - Tooling - Robots

SEGNERE.SA

FRANCE

Precision mechanics - Thin sheet-metal manufacturing

SEGULA TECHNOLOGIES

FRANCE

Management and participation in all phases of aeronautics engineering projects.

SLICOM INTERNATIONAL

FRANCE

Manufacture and assembly of pieces and mechanical, hydraulic, structure subsystems, moulds for composites

Aeronautic boiler-making, machining, mechanics, surface treatment, heat treatment, NDT. Civil and military aircraft structures maintenance

SNECMA

FRANCE

Aircraft manufacturer

SOFOP SA

FRANCE

Precision mechanics

SOPEMEA GROUPE

FRANCE

Tests engineering, tests, facility tests maintenance, training

SPECITUBES

FRANCE

Tubes producer

TECHNOFAN

FRANCE

Fans - Axial or centrifugal fans – turbine fans – brake cooling fans

THALES AEROSPACE

FRANCE

Complete solutions for all types of Aircraft

THALES AIR SYSTEMS

FRANCE

Surface radars, radar and sensor, air control and command, weapon systems and missiles

THALES AVIONICS ELECTRICAL SYSTEMS SA

FRANCE

Electrical power generation

THALES MICROELECTRONICS

FRANCE

We design, industrialize and manufacture active modules, low-frequency and microwave hybrids, very-high voltage power supplies.

TRONICO

FRANCE

Professional electronics contract manufacturer, TRONICO offers global services including design, industrialization, manufacturing, integration, repairing and storage of boards and electronic sub assemblies for small series.

WORKFLY / DRUMA

FRANCE

Drones

# MEXICO

## TEMPORARY LIST OF PARTICIPANTS

FRISA WYMAN-GORDON

### MEXICO

Aerospace Ring Rolling Facility: Titanium & Other High Temperature alloys

GALNIK, S.A. DE C.V.

### MEXICO

Surface treatments, Plating, Zinc Plating Nickel Plating, Zinc Nickel alloy Plating

HYDRA TECHNOLOGIES

### MEXICO

Manufacturer of UAV

SOLUCIONES TECNOLOGICAS

### MEXICO

Engineering of aerospace systems

TAM - TECNOLOGIA AEROESPACIAL MEXICANA

### MEXICO

Design and manufacture of hydrogen peroxide rocket systems.

### TECMAQ

### MEXICO

Precision machining

TURBORREACTORES, S.A. DE C.V.

### MEXICO

Repair & Overhaul of Turbine Engines - Engineering & Design Services, Tech Publications.

Mechanical Design for airframe & Engines. - Manufacturing of Aerospace Rigid Tubing - Machining services for complex parts, hard materials.

VOLARE ENGINEERING

### MEXICO

Interior design for aircraft passenger cabin/ Technical manuals for aircraft engineering and design

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<sup>i</sup> PPAP refers to the Production Part Approval Process. It is used in the automotive supply chain to establish confidence in component suppliers and their production processes. Suppliers are required to obtain PPAP approval from the vehicle manufacturers whenever a new or modified component is introduced to production, or the manufacturing process is changed. As a result of PPAP, payments are not made until the tool is in use for production and can result in delays of 18 – 24 months for payment of the tool.

<sup>ii</sup> Multiplier verified by CAMM, EDC and CME.

<sup>iii</sup> Note – FAA’s FAR requirements depend on the type and size of aircraft. Small personal aircraft tend to be under FAR XX requirements while larger commercial passenger planes tend to be governed by FAR BB regulations.

<sup>iv</sup> Calculation made using rates of \$69 to \$159 Euros/hr and an exchange rate of \$1.50 vs. actual of \$1.53 on March 13, 2008

<sup>v</sup> <http://www.oica.net/frankfurt-62nd-international-motor-show>