

Fact Sheet #1

Support Service for the high-performance machining industry

École Polytechnique de Montréal, in partnership with the Québec Aerospace Association, is officially launching a Support Service for the high-performance machining industry, an initiative that will assist this sector at both the technological and competitive levels. This technology-support service is made available due to the financial participation of Québec's *Ministère du Développement économique et régional* (Regional and Economic Development Ministry), which is making an annual contribution of more than \$170,000 to the \$425,000 project.

Background

In recent years, the manufacturing sector has reaped the benefits of both a thriving economy and a weak Canadian dollar to increase its sales. On the other hand, these favourable market conditions have disguised an accumulated productivity lag. In a context of market globalization, this industry is now in a vulnerable position.

In an effort to stay in the race, many companies have begun modernizing their machinery by acquiring machine-tools for high-speed machining (HSM). However, many managers have become aware of the lack of references and competent and impartial HSM experts. Unfortunately, technological advancement in HSM locally is now proceeding by trial-and-error.

Companies are currently in the regrettable position of acquiring leading-edge equipment without possessing all of the know-how necessary to optimize its use. Because they lack the advanced knowledge, these companies' machinist-programmers are inclined to under-use this high-end equipment. The "pressure to produce" leaves little time to optimize and acquire new know-how.

Many companies do not have the in-house resources to quickly overcome the difficulties that accompany this technological change; they often have no engineer who specializes in manufacturing.

In order to be able to compete with Mexico, Brazil, China and other countries that have the same cutting-edge technologies, we have no choice but to do everything possible to ensure that local manufacturers are able to use their new equipment to 100% capacity.

For this reason, École Polytechnique, the Québec Aerospace Association and the Regional and Economic Development Ministry have taken the initiative of creating a team of professionals who are available to support manufacturers in their efforts.

The team

The technical team directly assigned to serving the industry is composed of three engineers and a technician, all graduates in mechanical manufacturing and with industrial experience.

Huron Canada, a main partner in Polytechnique's new *Laboratoire de recherche en fabrication virtuelle* (virtual-manufacturing research laboratory), kindly agreed to provide the three engineers with a six-month internship at its machine-tool factory in Strasbourg, France. There, they also received advanced training and are now ready and eager to provide their services to the local manufacturing industry.

Targeted industries and regions

The new service is available to all machine shops and machine-tool departments that manufacture components, moulds or equipment for many sectors, including the aerospace, plastics and automotive industries.

The machine shops are located across Québec. An analysis of their location by region has shown that deploying the new Support Service in the *Saguenay/Lac-Saint-Jean*, *Centre du Québec*, *Capitale Nationale* and *Chaudière-Appalaches* regions would ensure that the service reaches 88% of Québec's machine shops.

Services offered to companies (by École Polytechnique and its partners):

- Needs analysis
- Technical support
- Conducting of pre-series and cutting tests
- Research into proper conditions for machine usage, improvement of parts-machining quality
- Process optimization and development
- Turnkey industrialization and implementation
- Technology validation and supplier-product rating
- Standardization and rationalization of equipment and cutting fluids
- Assistance in selection of tools and cutting fluids
- Cutting-force measurement
- Analysis of tool wear-and-tear
- High-speed machining (chip formation, machineability, cutting force)
- Machining of difficult materials (hard-drilling and turning, superfinishing)
- Machining of complex surfaces (5-axis machining strategy, surface quality)
- Analysis of CAD/CAM tool-path generation
- Surface analysis and machining strategy
- Dimensional or geometric metrology
- Characterization of the dynamic behaviour of machine-tools
- Machine-tool benchmarking
- Support for the selection, acquisition and implementation of technologies
- Project specification
- Preliminary preparation for introduction of a technology
- Study of peripherals, organization of production
- Employee internships and specialized training (operation, programming, metrology)
- Technology transfer

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