Have you thought about boosting your manufacturing process with mechatronic solutions?

MECHATRONICS FOR MANUFACTURING

MANUFACTURING PROCESSES DESERVE MECHATRONIC SOLUTIONS

CEDRAT TECHNOLOGIES
Innovation in Mechatronics

***Cedrat Technologies** has already demonstrated that mechatronic solutions create high added value in manufacturing processes while being cost effective. Our customers are advanced **machine manufacturers, machine-tool builders, tool makers, spindle suppliers and end users** willing to optimize advanced **metal cutting, metal forming, extrusion and chemical processes**.*

*Our mechatronics components such as **actuators, sensors, drivers and controllers**, are specifically designed for manufacturing environments. They are extra flat, powerful and precise and are traditionally used in harsh, heavy duty and high temperature environments. In addition the motional and sensing performances cover a wide dynamic bandwidth.*

*Starting from diagnostic services, **mechatronic systems are designed to be Plug & Play Products** or integrated as OEM versions in new machines. The scope of our solutions is not limited to engineering work. They offer the opportunity of large-scale industrial cost-effective products. **The projects of today are the smart products of tomorrow**.*

Active Chips breaker using APA® and SA75D

VIBRATION ASSISTANCE

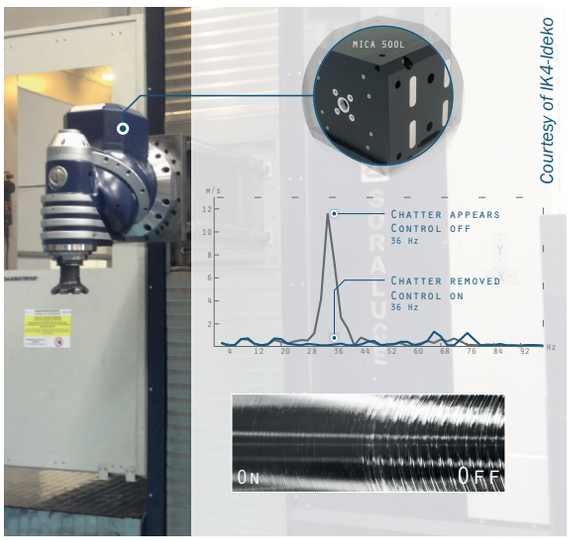
Advanced materials for extreme applications are more **difficult to machine**: Super-alloys, hard, brittle, ductile, multi-structure or composite CFRP materials. The requirements for part geometry profiles follow the same evolution in complexity as manufacturing processes improve.
Cedrat Technologies provides **Plug & Play smart tool holders** and embedded actuation solutions for the **generation of additional vibrating energy** in the manufacturing process. This association increases the removal / forming rate, improves process quality, increases tool life, saves energy and makes possible complex machining. Whereas controlled low frequency vibrations already address cutting / forming applications, high frequency & ultrasonic solutions provide an innovative approach in extrusion and chemistry processes.

OPERATION - PROCESS	SOLUTION	BENEFIT
Laminated Carbon / titanium Drilling *6 axis robot unit*	Vibrating tool holder Plug & Play via HSK 32	Improves hole quality 30% time saving per cycle
Multiple-hole drilling *Electrical discharge machining*	OEM motion solution Embedded into the EDM head	Overall cycle time reduced by 30% Stabilization of the process
White goods forming *Deep drawing / stamping process*	OEM friction control unit Embedded into the tool and die	No crack formation on sheet metal Reduce down-time and reject rates
Hard-to-machine material *Turning process*	Chip / swarf breaker Plug & Play via DIN 69880	Controlled chips / swarfs length No interrupted production
Hard and brittle material *Milling, grinding, turning and drilling*	Ultrasonic or high frequency tol Plug & Play attachment tool	Improves glass cutting quality Faster machining of hard material (+10%) Tool life increased on diamond tool (+20%)
Sono-chemistry *Antibacterial treatment of textiles*	Innovative Ultrasonic transducer Tank unit	Product life time (+200%)

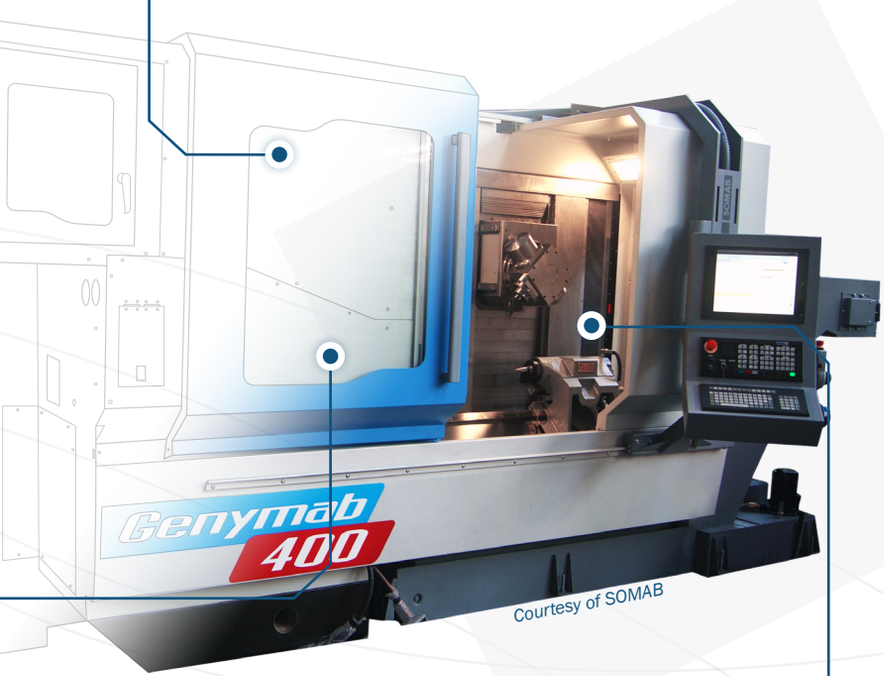
OPERATION - PROCESS	SOLUTION	BENEFIT
Heavy roughing operations *Milling machine*	Active damping Solution Embedded into spindle head	Cutting capability is doubled Improved stability is observed
Longitudinal turning steel slender bar *Lathe machine*	Semi active work-holding device Active Plug & Play tool holder	Reliability is improved +20% higher feed rates

VIBRATION DAMPING

Milling, turning, grinding and drilling processes are limited by **chatter** vibrations related to the flexibility of the machine tool structure. Such vibrations reduce cutting speeds to well below the capacities of machines or tools. They also result in noise, poor finish, unacceptable tolerances and sometimes tool breakage.
Parasitic vibrations are removed by installing intelligent **damper** units on existing or new machines. Our solution can be supplied in a Plug & Play format for immediate effect or fully integrated. Typical chatter vibration reductions over [1Hz-1kHz] are [-10dB; -20dB]. Improved **stability** of the process is observed in all cases.

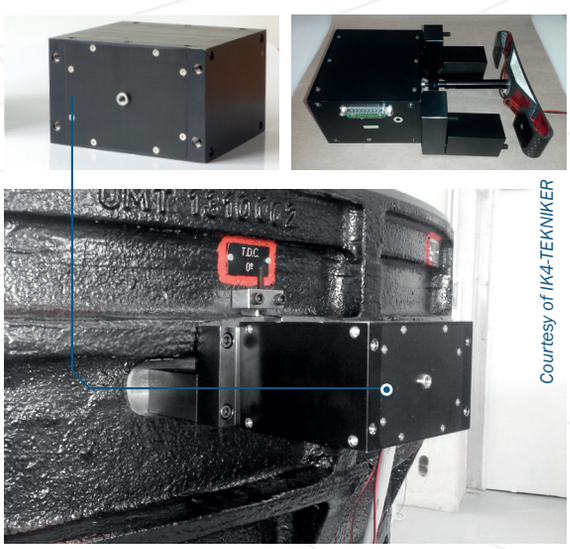


Active vibration damping through MICA™



FAST & PRECISE POSITIONING

Long and slender parts are distorted during machining. Cutting and forming conditions may also vary during the machining process without being observed and controlled. An additional cutting axis may be necessary to produce **complex parts**. These distortions lead to inacceptable inaccuracies and decrease process flexibility.
The solution passes through a sensory and **active fixture system** which detects **distortion** and controls active repositioning of the clamp achieving the desired part geometry and tight tolerances.



Active clamping fixture using MICA™

OPERATION - PROCESS	SOLUTION	BENEFIT
Oval or aspherical machining *Synchronized with Lathe rotation*	Long stroke servo tool Lathe turret interface	Fast machining of optics high quality oval piston manufacturing
Accurate finishing *Milling, grinding, turning*	XY piezo stage Embedded into the clamping fixture	Precise finishing Machine resolution improved: 10nm
Accurate finishing *Milling, grinding, turning*	Force sensor Embedded into the work-holder Plug & Play via standard tool holder	Precise cutting force Improves multilayer cutting quality
Long and slender part machining *Milling, grinding, turning*	Active clamping fixture	Tighter tolerance achieved

Compact, dynamic & precise

ACTUATORS

Encapsulated Amplified Piezo Actuators: APA®
High temperature direct Piezo actuator: PPA™
Extra flat magnetic actuator: MICA™

CONTROLLERS

Powerful piezo driver: SA75D
Embedded magnetic driver: CSA96
All in one CCBµ20

SENSORS

Contactless position sensor
Multi axis & rotary force sensor

CEDRAT TECHNOLOGIES offers off the shelve mechatronics products including piezoelectric & magnetic actuators, motors, mechanisms, transducers and sensors with corresponding drivers & controllers. These mechatronics products are used for scientific and industrial applications requiring features such as: micro & nano positioning, generation of vibrations, micro-scanning, fast & precise motion control, active control of vibrations, energy harvesting...

Most of products are available in OEM versions for low cost & high volume industrial applications. CEDRAT TECHNOLOGIES offers also services including design, R&D under contract and training.

CEDRAT TECHNOLOGIES is a SME located in Meylan, Inovallée, the French Innovation Valley near Grenoble.
CEDRAT TECHNOLOGIES is recognised as a highly innovative company and has received several awards.
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SEVENTH FRAMEWORK PROGRAMME