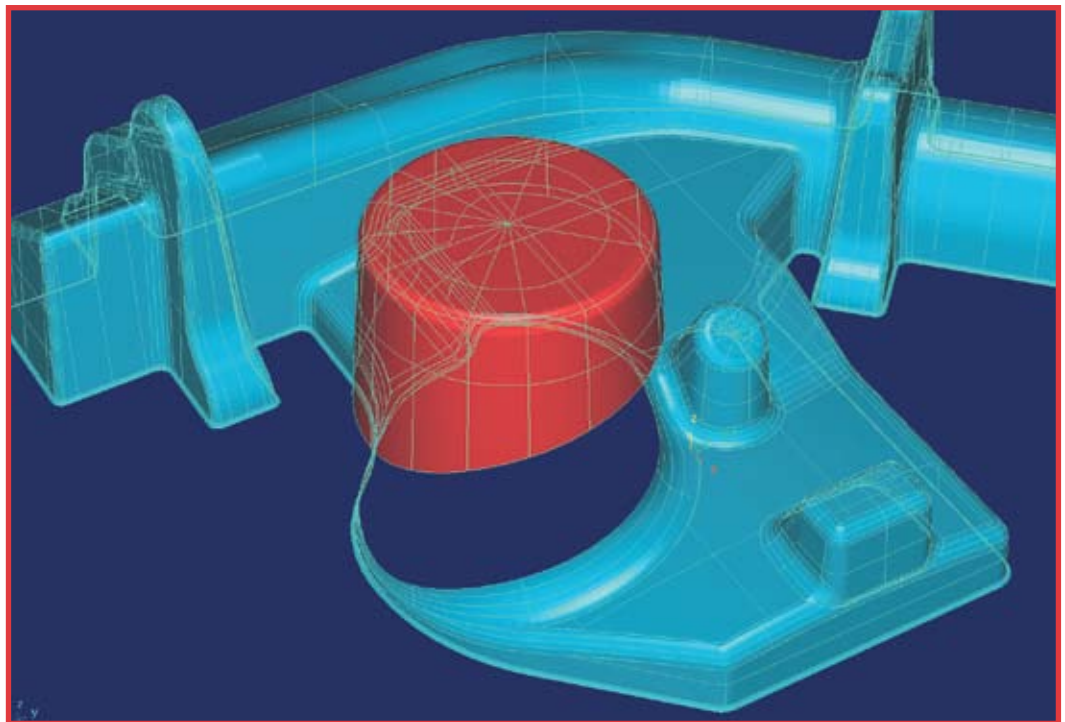# HI-MILL
ISOGRAPH

CAD - CAM Software
for high speed milling


FIDIA
Giving shape to design

ISOGRAPH the 2½D CAD/CAM

ISOGRAPH is a 2½D CAD/CAM with a highly innovative user interface that is especially suited to the workshop environment. It is ideal when machining operations must be programmed and executed rapidly, such as the machining of pockets, smoothing, machining of profiles, drilling, boring. Isograph can be perfectly integrated on the FIDIA Numerical Control, but its potential can also be appreciated in stand-alone use on an ordinary Personal Computer.
The use of soft keys and the mouse allow for easy and immediate interaction by all operators, with no specific knowledge of programming being required.

ISOGRAPH can be used to:
- define geometric profiles
- manage ISO files
- import geometric elements written in DWG/DXF formats
- import files written in IGES format
- employ a powerful programming language
- generate contouring of open or closed profiles
- generate paths for re-machining of residual material
- generate fixed drilling, tapping and boring cycles
- machine pockets with a rectangular, circular or general profile
- generate smoothing cycles from the dialogue window
- write and simulate CNC procedures
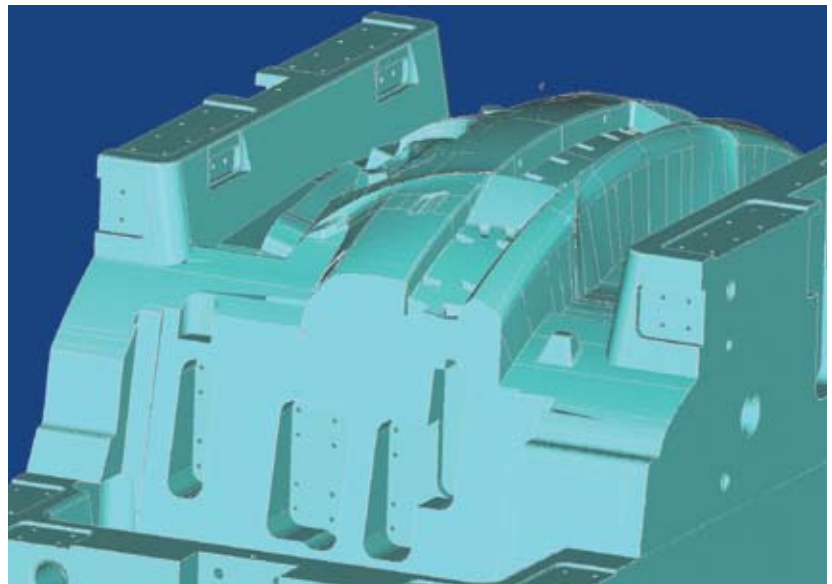
defining profiles

ISOGRAPH is equipped with a powerful and intuitive GRAPHICS EDITOR for defining geometric elements and profiles.

The operator has no need to learn a specific programming language or the syntax of particular ISO functions.

The soft keys guide him, by means of icons, as he defines the geometric profiles. Rotations, offset and translations can also be applied to the profiles.

machining profiles

Profiles, however defined (ISO, Graphics Editor, DWG/DXF), can be compensated on one of the main planes, or on any positioned plane.

2D radius compensation on any reference plane can also be applied to profiles defined in 3D.

Compensation of the profile can be repeated on more than one level to allow for the machining of complex walls.

Once the necessary technological parameters have been entered, ISO-GRAPH generates the tool path in complete safety thanks to its tested anti-collision algorithms.

re-machining profiles

After generating tool radius compensation of a profile, ISOGRAPH automatically identifies zones where there is residual material. Appropriate re-machining paths, using progressively smaller tools, can be defined simply and intuitively. Also re-machining paths can be repeated on more than level.
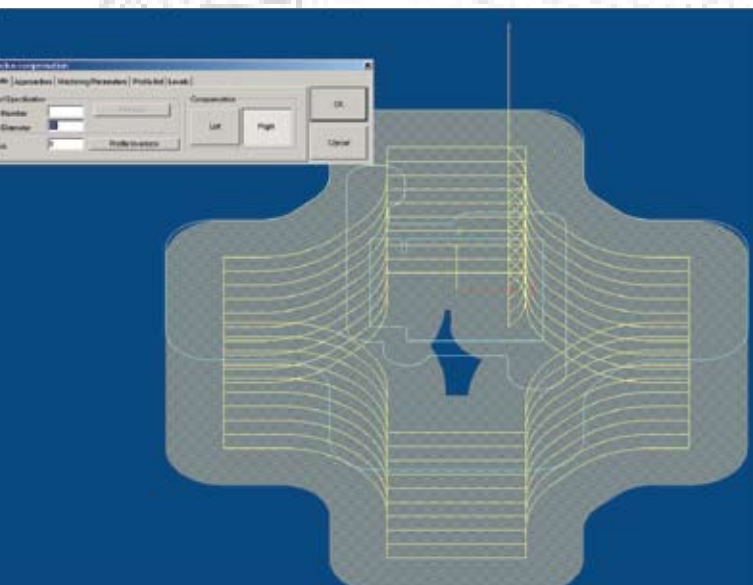
DXF/DWG and IGES reading

ISOGRAPH imports maths written in DWG/DXF and IGES formats. ISOGRAPH enables to machine its own profiles: generating tool radius compensation paths, re-machining of residual material, pocket machining and to associate fixed cycles (G82, G83, etc.) to elementary geometric elements. ISOGRAPH simplifies complex maths thanks to its layer management (logic programming levels).

fixed cycles

ISOGRAPH is equipped with a wide range of fixed cycles:
- drilling (G82, G83, G182, G183)
- tapping (G84, G184)
- boring (G85, G86, G185, G186)
- deep drilling (G282)
- helical drilling for high speed

Any fixed cycle can be repeated at specified intervals along a profile or applied to all the elementary entities selected by the operator.
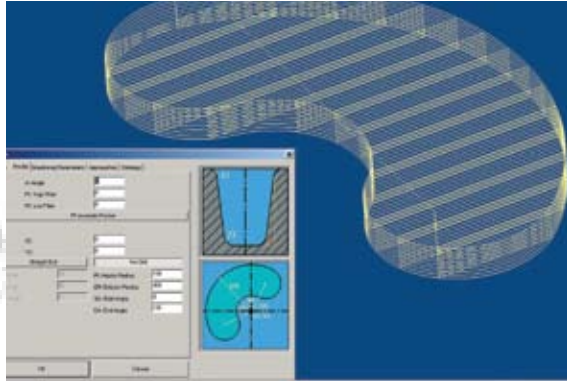
recognition of holes

Furthermore the recognition of holes in the IGES format is also available for the automatic definition of the hole's first and last values both on the working planes (G17, G18, G19) and on any inclined planes.
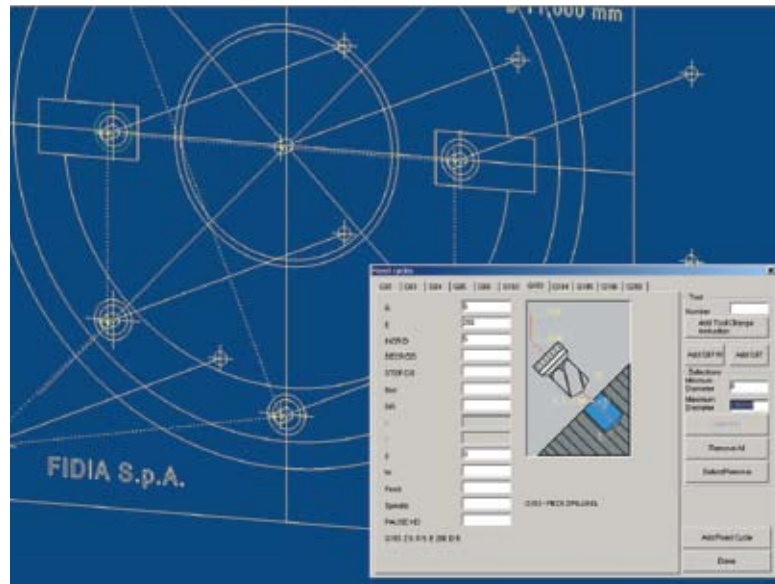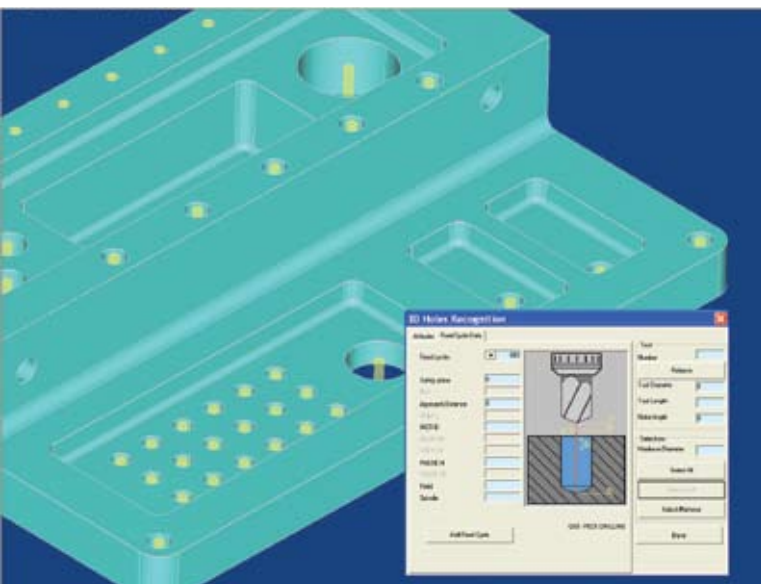
pocket machining

Machining pockets using ISOGRAPH is particularly efficient owing to the powerful operator interface that enables the following to be defined:

- the profile to be machined (circular, rectangular, straight/circular slots or generic),
- depth and inclination of side walls,
- machining strategy (contouring or zigzag),
- machining typology (roughing or finishing),
- technological parameters for the generation of tool paths,
- the tool's most appropriate approach,
- machining allowance on pocket sides and bottom.

It is also possible to generate paths with no abrupt changes of direction that are particularly suited to high speed.

pocket identification
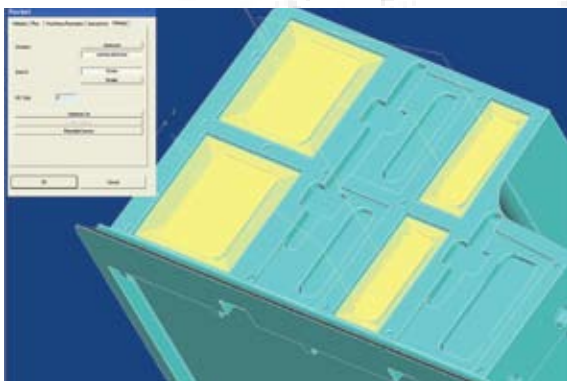
Identification of pockets in the IGES format is available and possible both on the working planes (G17,G18 e G19) and on the inclined planes. Within one attitude more than one pocket can be machined both in roughing and finishing modes.

Should the IGES file contain surface descriptions, the pocket geometric shall be identified directly on the maths.

It is therefore possible to identify and manage pockets in any section. Any possible internal slots shall be identified and automatically excluded from the machining.

management of CNC procedures

ISOGRAPH makes available a powerful environment for the management of CNC Procedures. Detailed dialogue windows enable parameters and commands to be written in a Procedure and modified, avoiding syntax errors. When the Procedure is complete, and before execution on the machine tool, ISOGRAPH simulates its operation indicating any problems.
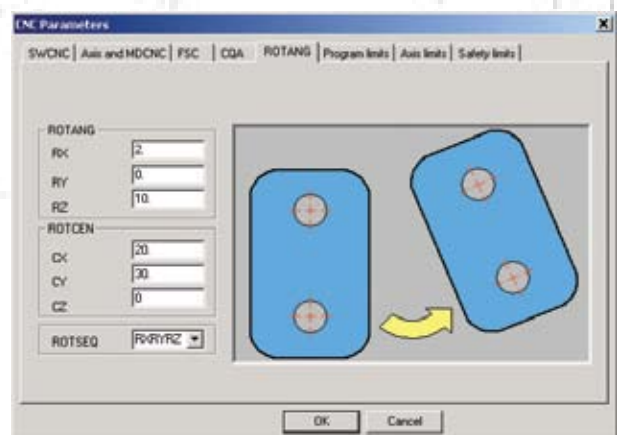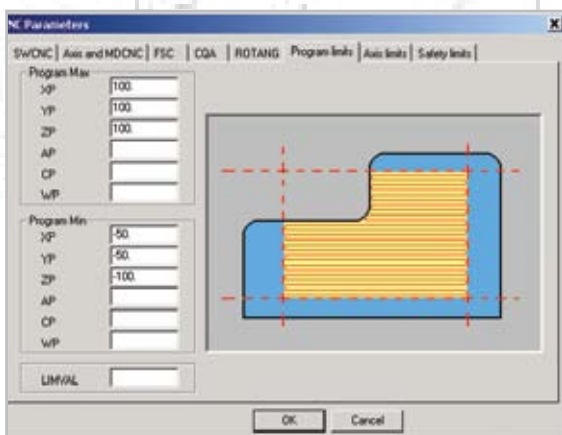
HI-MILL the workshop CAM

HI-MILL is the software that produces tool paths for the milling of complex forms. Its simple and intrinsic approach adapts perfectly to the modern workshop while its solutions are expressly suited for complex and innovative technology such as that of High Speed.

Thanks to its optional module HI-MILL is able to read clouds of points that describe the form of a physical object and are used for milling.
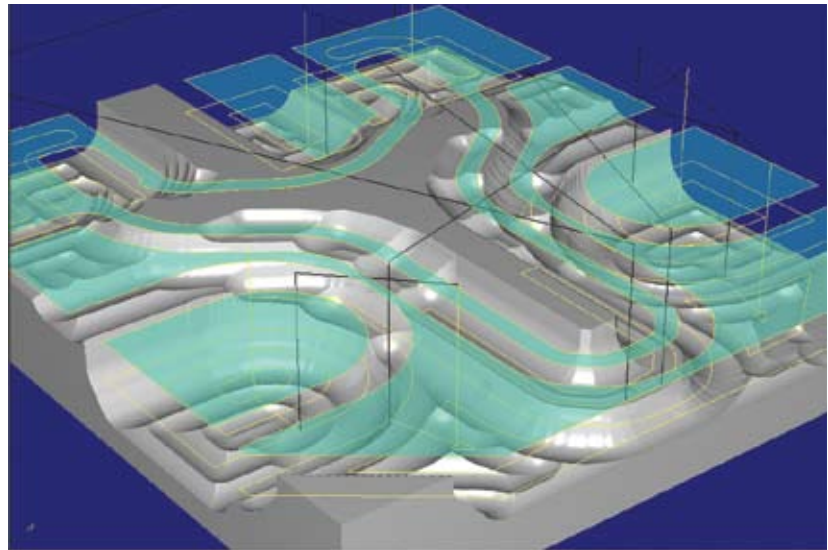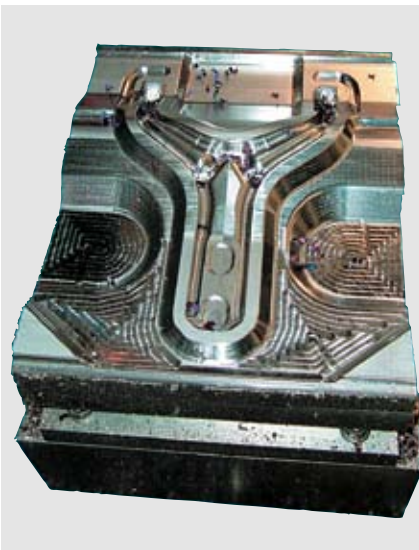
This applies to clouds of points obtained by scanning with an analog tracer, a laser or using optical systems. A specific algorithm has been specially developed in order manage large quantities of data efficiently.

Reverse Engineering

HI-MILL transforms the elementary descriptive data for an object, expressed by means of X, Y and Z co-ordinates, into a skin structure written in the standard STL format and which can easily be interpreted by the most widely used Reverse Engineering systems.
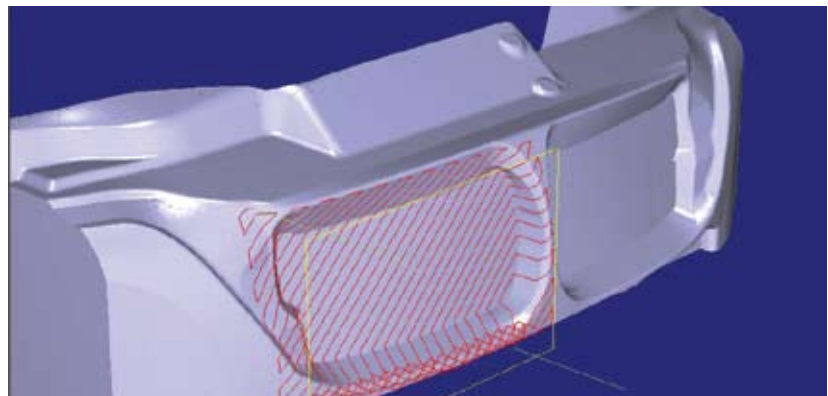
3 axes + 2 easily programmable

With machine tools equipped with rotary heads, it is extremely important to already be able to program the positioning of the tool axis in space during the tool path calculation phase.

In this way, the milling enjoys all the advantages of this programming, namely: a better use of spindle power, an optimum tool yield, a high surface quality and the ability to machine undercut zones.

HI-MILL offers advanced solutions for this type of machining providing for, among other things, the definition of the starting rough shape (rough model) which is used during the processing of the roughing out operation so as to optimize the path by machining with the tool always in contact. The rough model can be updated after each tool path calculation in order to optimize subsequent processing.

## roughing out with HI-MILL: the most reliable solution

As well as spherical tools, HI-MILL provides optimum management of cylindrical and toric tools. It is always possible to adjust the calculation accuracy of the pass that is in contact with the part in order to obtain a stock thickness that is as far as possible constant.

A preventive check on the dimensions of each individual milling zone is compared with the geometry of the tool specified so as to prevent any possible damage. A special algorithm with a high processing speed allows for the machining of very soft materials, as does the generation of roughing out operations with a high material removal rate. This completes the range of technologically advanced solutions for roughing out offered by HI-MILL.
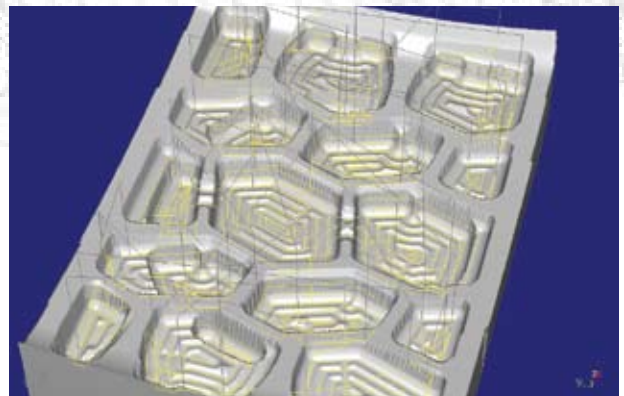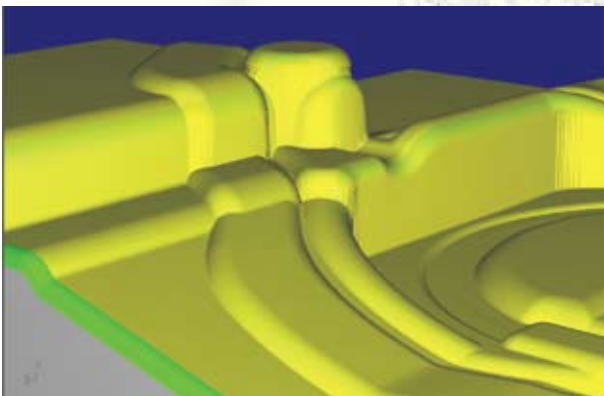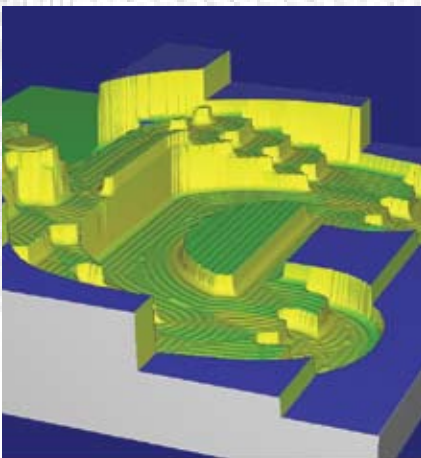
high speed milling
with HI-MILL
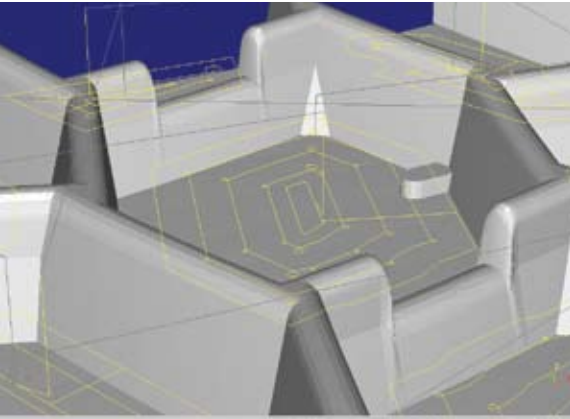
The HI-MILL CAM has from the outset been a highly recommended tool for generating high speed milling paths. The complexity of this technology means special attention is given to the way in which the tool moves and cuts into the material to be removed and traces its trajectories. Simple but effective options control entry of the tool into the material in any condition.

HI-MILL is able to generate paths with no abrupt changes of direction e therefore particularly suited to high speed. With respect to the preceding machining, the software calculates each pass comprising the path in such a way that the removal of material is limited to the quantity specified by the user and generates, if necessary, several consecutive passes in order to complete the machining cycle.

The care with which the points are distributed along all the paths and their density have a positive effect on milling times and above all on the surface quality of the finished part.

the HI-MILL
simulation
module

HI-MILL incorporates a module for displaying the rough part that is derived from the simulation of individual paths calculated with any tool inclination. Any stock thickness is highlighted in colours that vary according to the quantity of residual material.
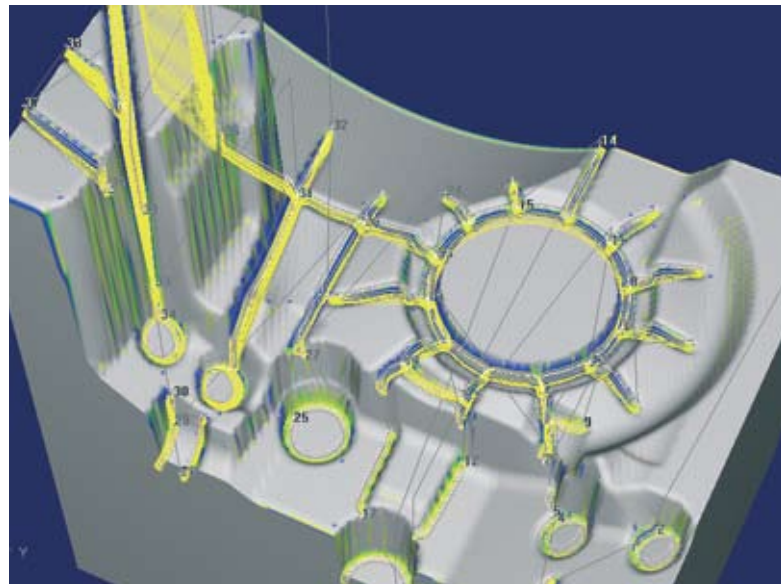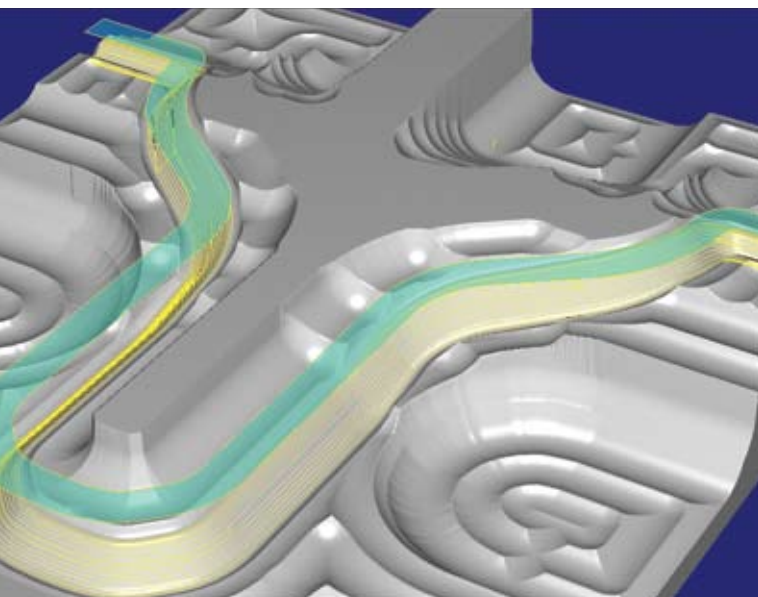
CAD functions

HI-MILL is able to modify CAD objects forming the triangle model and to add new objects.

Transformation Functions:

- ▪ TRIM
- ▪ DELETE
- ▪ TRANSLATE
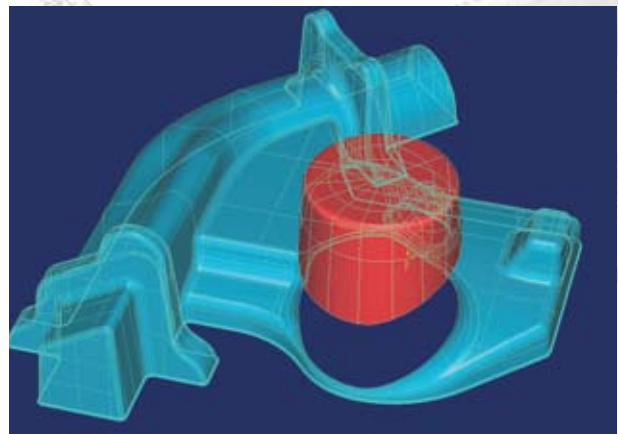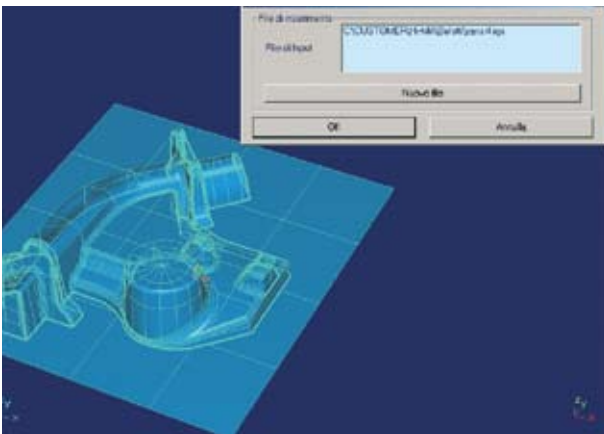- ▪ ROTATE
- ▪ SCALE

BLANK

It enables to hide CAD objects by removing them from view (they become transparent). The hidden objects are however stored in the related file so that they can be later restored. The function to temporarily hide some objects is particularly useful to help to view and select objects placed on the background. After these operations, however, the hidden objects will have to be restored otherwise they will not be considered when calculating the tool path.
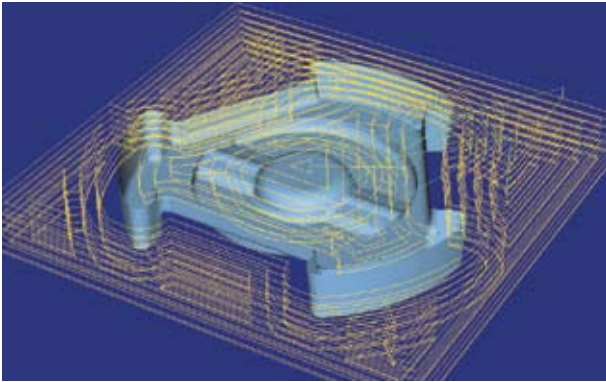
REVERSE NORMAL

For each selected surface, it inverts the normal vector's direction, swapping face roles: front to back and vice-versa automatically updating colours. This, of course, influences offset operations.
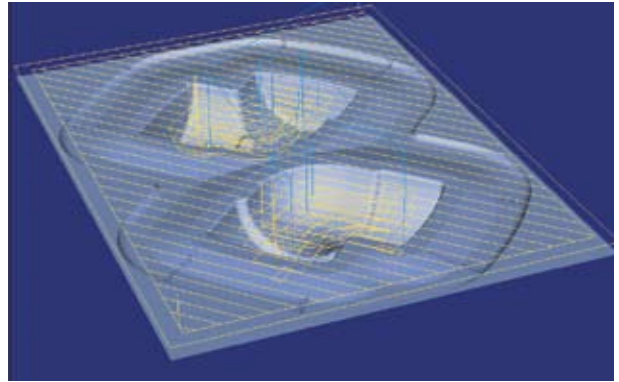
OFFSET

Each selected surface is modified so that each point is translated along its related normal vector covering the set distance value. A positive value moves the points towards the vector's direction a negative one moves them in the opposite direction.

Two offset modes are available:

■ Absolute: the specified value expresses the offset according to the surface's original dimensions when its offset was zero.

■ Relative: the specified value expresses the offset according to the surface's effective shape. This is the most frequent used mode.

Creation of new cad objects

HI-MILL enables to add to the model new flat surfaces parallel to the XY plane of different shapes (rectangular, circular, polygonal). Such surfaces can be employed to cover, for example, any possible faults on the input files used to outline the project, or to protect a file from any unwanted modifications.

ENTITY ANALYSIS

By the means of this menu option it is possible to have information concerning entities on the CAD model. Information may be linked to a specific or generic entity according to the two options provided.

UNDO-REDO

Effects of commands made within a CAD session (cancellation, insertions, modifications) can be deleted thanks to an "undo" mechanism allowing to go back, step by step, right to the moment of the session CAD entry. A corresponding "redo" mechanism enables to correct any possible mistakes in the "undo" process.
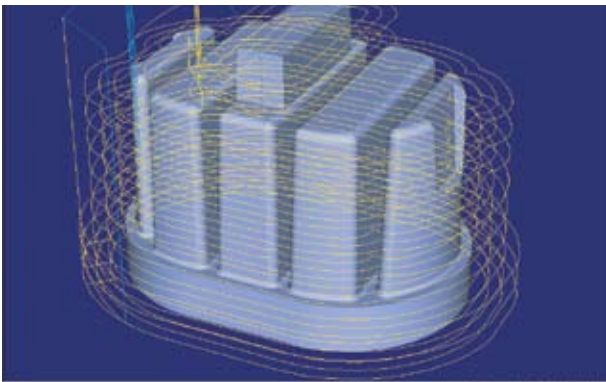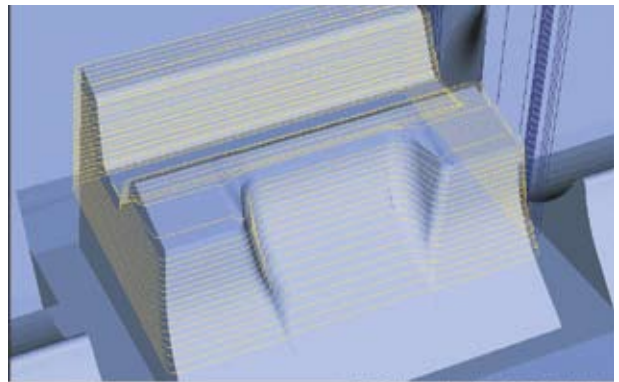
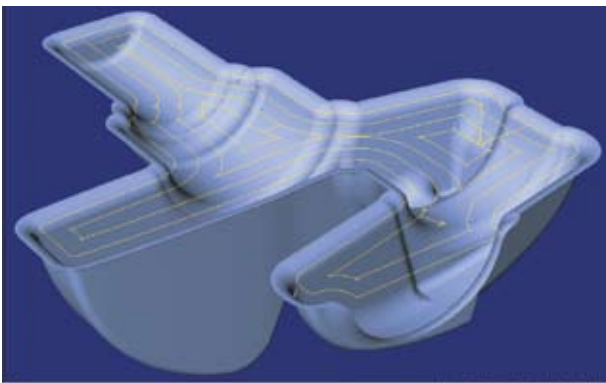# Machining

of the rough part by contouring

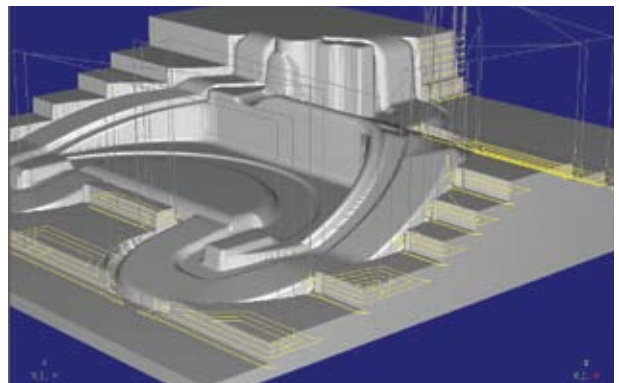of the rough part by parallel passes

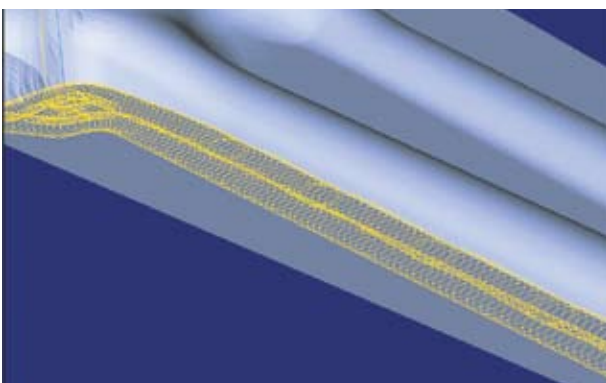of the rough part by merging
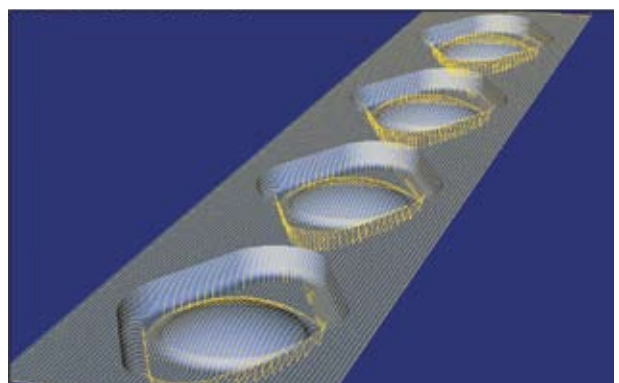

of the model by contouring

with fluidity of movement

by re-machining stock thickness

with cycloid movement

by parallel passes

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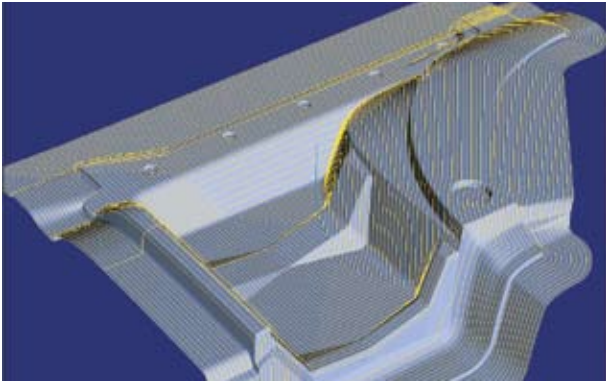Tel. +86 831 3565870
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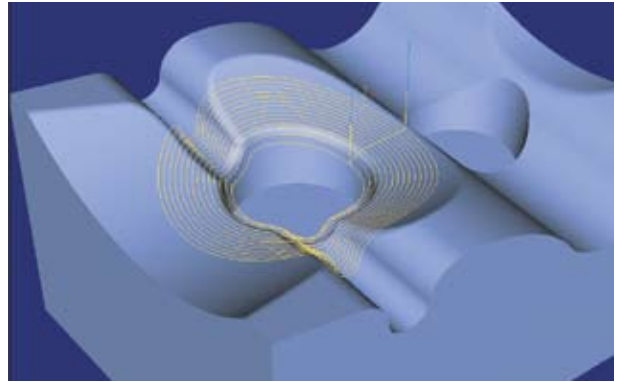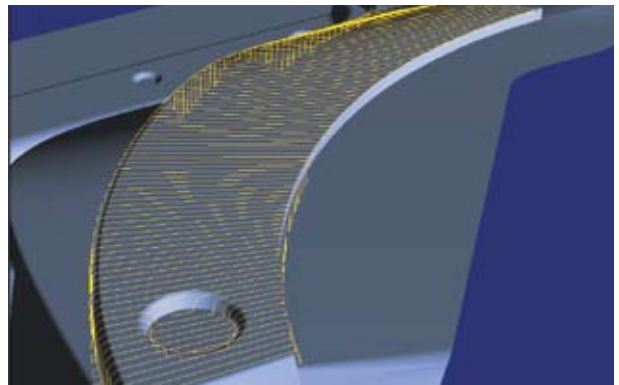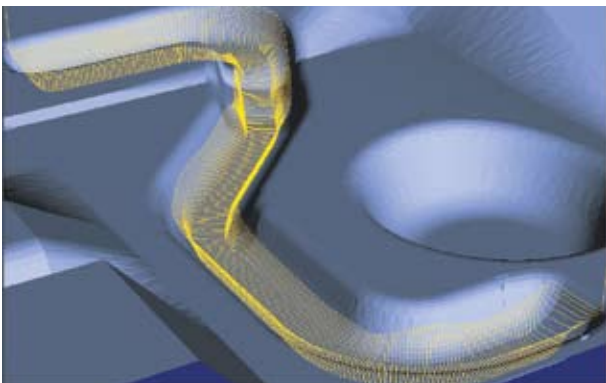Fax +39 0141 296496
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by contouring
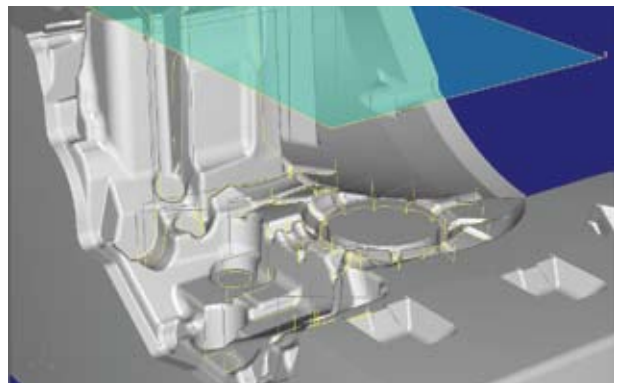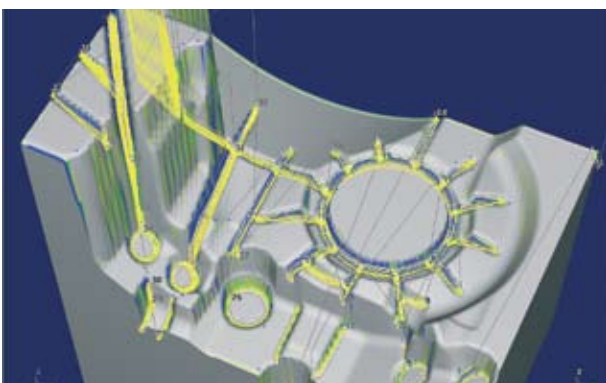

with circular movement
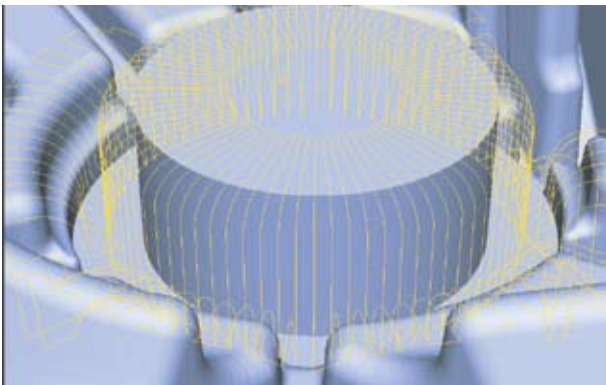
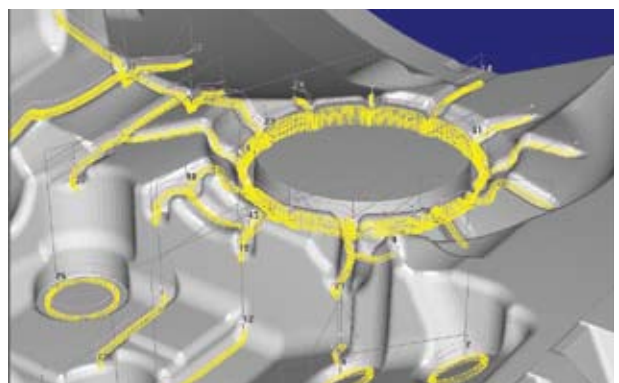with radial movement

limited by guide curves

with multiple stock thickness management

guided by two-dimensional profiles

bi-tangency re-milling

longitudinal radii

integrated

in the Fidia CNC

or on an external PC

ISOGRAPH and HI-MILL can be installed on a Microsoft Windows XP platform and therefore can be easily integrated with the FIDIA CN software. ISOGRAPH and HI-MILL perfectly integrate in the FIDIA CN environment thanks to the heritage coming from its operator interface and soft-keys. ISOGRAPH and HI-MILL therefore are an essential instrument in the hands of skilled and resourceful operators.

The same interface can be also used should ISOGRAPH and HI-MILL be installed on a stand-alone PC.

This configuration offers many Post Processors for the generation of customized tool paths for the client's machines.

ISOGRAPH and ISOGRAPH can be installed on PC featuring the following minimum configuration recommended:

- CPU Pentium 4 - 1,7 GHz, 256 KB Cache memory
- RAM 512 MB Memory
- 40 GB Hard disk
- SVGA interface with 65536 colours for chosen resolution.