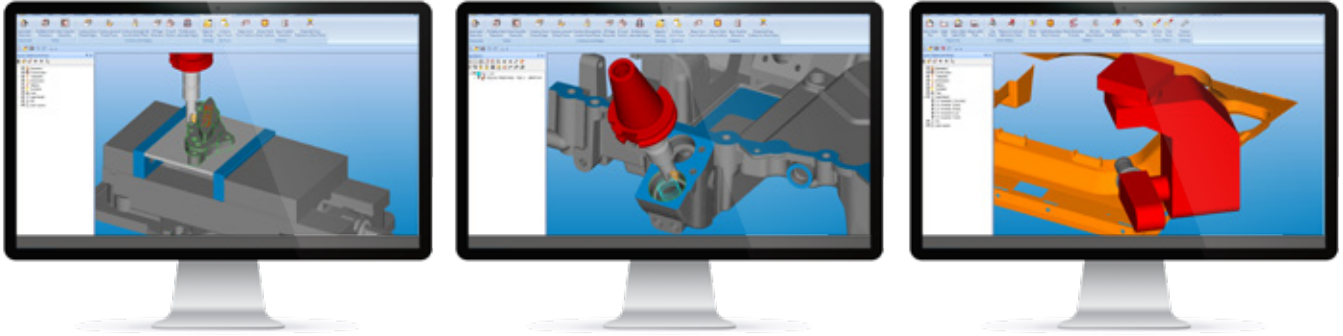# HEXAGON

ALPHACAM Machinist

Conventional milling

Core foundation

All ALPHACAM modules are built using one core foundation which includes geometry creation commands such as line, arc, circle, rectangle, polygon, spline and polygon, ellipse, spline and polyline together with surface creation options. Other features include intelligent snapping functions such as end, mid, centre, intersect, tangent, quadrant and auto.

Import options for DXF, DWG, IGES and a variety of solid model formats ensure compatibility with other CAD systems. There are also various geometry editing functions including undo, redo, move, copy, rotate, mirror, scale, break, trim, explode, join, extend, fillet, chamfer and offset.

All modules have user defined tool and material libraries controlling many of the important machining parameters such as tool direction, automatic lead in and lead out, corner cut options (straight, roll round or loop), G41/42 tool compensation and automatic calculation of speeds and feeds.

Advanced mill

Renowned in the metalworking industry for ease-of-use, ALPHACAM can contour, pocket, engrave and hole-drill complex parts. Functions such as 2.5D multiple depth cutting, pocketing with an unlimited number of islands and tool radius compensation can be controlled using its intuitive user interface.

Advanced Mill even offers roughing and finishing strategies for complex 3D surfaces, STL and solid models. With its powerful post-processing ability, ALPHACAM can generate NC code for any machining centre.

Multi-axis machining

Work plane support for machining centres with 4 and 5-Axis indexing capability is made simple with ALPHACAM. Parts can be dragged and dropped onto a fixture, their datum set and machining sequence automatically optimised.

The advanced solid simulation with full machine build, within ALPHACAM means that the tool path can be verified before it reaches the machine tool. Clamp and fixture collision detection, support for work co-ordinate offset tracking and plane rotation means that the NC code generated is right first time.

> **I've been using ALPHACAM for more than 20 years and it gets better and better."**
>
> **Mark Durey,**
> Cutting Room Partner
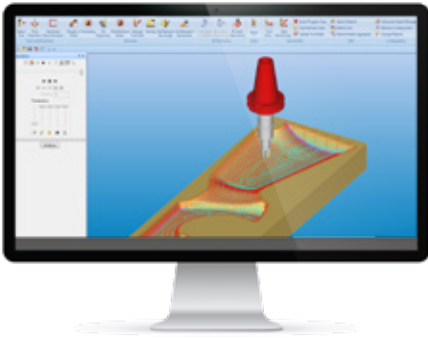
3D milling

Multiple 3D rough and finish machining strategies of surfaces, STL models and other native CAD models are available within ALPHACAM. These strategies can be applied to any work plane, allowing for 3 plus 2 machining to be programed using ALPHACAM on 4 and 5-Axis indexing machines. ALPHACAM's Ultimate module is capable of 4 and 5-Axis simultaneous machining of surfaces and 3D trim curves.
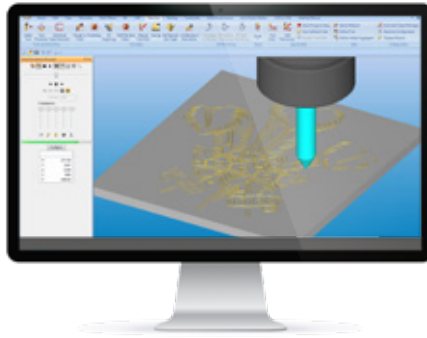
3D engraving

Artwork and text can be easily created and machined using ALPHACAM's powerful 3D engraving. This command contours geometries with a form tool, and on meeting a sharp corner automatically retracts the tool to produce a sharp corner, often referred to as embossing.

Post processors

With manufacturers facing ever increasing global competition, it is essential to maintain maximum machinery efficiency to ensure optimal production throughout. Having an optimised link between ALPHACAM and your CNC machines, through the use of post processors, is a key component in attaining this efficiency.

Having developed post processors for virtually every machine control in use today, ALPHACAM has the knowledge and experience to fine tune your CNC output ensuring maximum yield and quality in the shortest possible time.

> **We place a great deal of emphasis on developing our in-house skills and, in this respect. we have been impressed by the training and support we've received from ALPHACAM."**
>
> **Bill Taylor,**
> Sunseeker

Waveform

Constant engagement with material

Although the Concentric pattern looks much simpler at the first glance the problem is that the tool "digs" into each corner causing the tool to overload, leading to reduced tool life or tool breakage. In reality the machine tool operator may have to reduce the cycle feed rate to compensate and thus, increase the manufacturing time.

As Waveform maintains a constant engagement the feed rate can remain at the optimal value throughout the cycle. This will improve the tool life and greatly reduce the risk of tool breakage.

The Waveform pattern

To maintain a constant chip load the cycle uses the philosophy that we machine from "Stock to part". This reduces the amount of intermittent cuts, particularly on external regions, which means the tool is engaged with the material for longer without lifting clear. Traditionally, cycles generally offset the component until they meet the stock. This can lead to the generation of sharp corners and discontinuous tool paths.

For pocket regions the tool will helical in to depth at the centre and open the pocket up so that it can create a continuous spiral cut until the edge of the pocket is reached. Any remaining corners are then removed.

Waveform roughing

Waveform roughing strategy is a high speed machining technique that maintains a constant tool cutting load by ensuring the tool engagement into the material is consistent. The tool path moves in a smooth path to avoid sharp changes in direction which maintains the machine tool's velocity.

- Reduces cycle time
- Improves tool life
- Lengthens machine maintenance cycles
- Keeps constant chip load
- Cuts deeper and faster
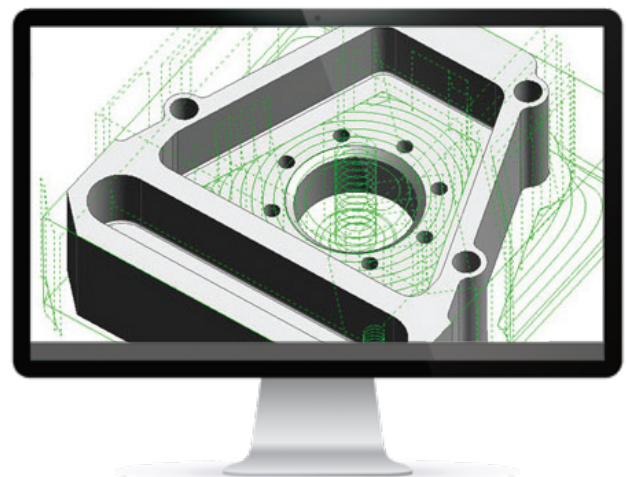
Mill, turn, wire

Wire EDM

2-Axis machining with optional constant draft angle and 4-Axis shape-to-shape cutting are fully supported. Multi-level block heights can be automatically calculated if the wire angle exceeds the CNC machine's capability.

Turning

All standard 2-axis turning operations are quick and easy to generate using Alphacam, with support for both linear and canned cycle NC code. Along with an extensive standard library, any shape and size tool can be created within Alphacam, the tip and holder of which are constantly checked to avoid fouling of the part.

Both twin turret and sub-spindle operations are supported by the Advanced Lathe modules to which automatic and manual synchronisation can easily be applied. From simple 2D slots and holes to the simultaneous 5-Axis machining of complex 3D surfaces and Solids using driven tools, Alphacam makes it easy.

Profiling

Automatic nesting of parts, for sheet optimisation, is just one of the reasons why Alphacam is an excellent tool when profiling using lasers, water-jet and plasma cutters. Links to machine-specific technology tables are made easy using Alphacam's powerful API and fully integrated Microsoft® VBA. 5-Axis support for planar contouring and drilling as well as simultaneous machining for trimming are all supported by Alphacam.
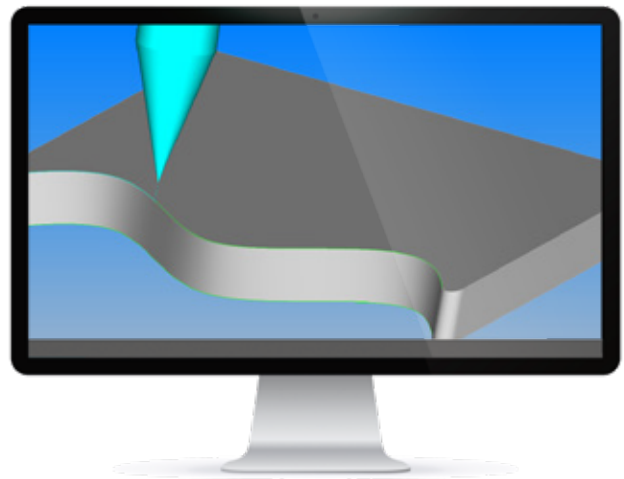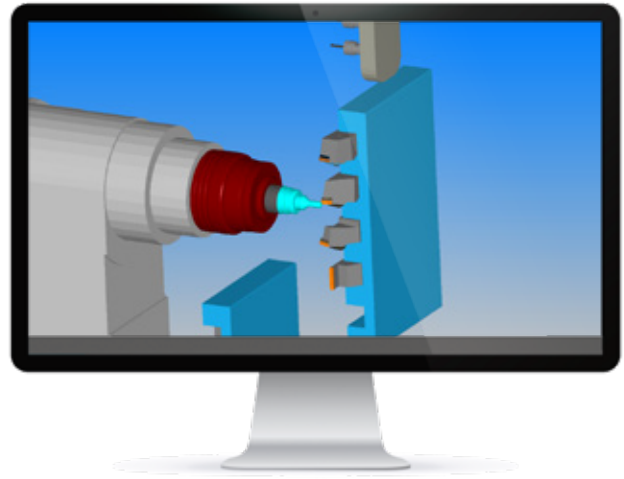
ALPHACAM.... state-of-the-art software. Seamlessly, accurately and speedily manufacturing high quality parts for our aerospace, motor sport and satellite customers."

Kevin Stockwell,
Leemark

ALPHACAM | Advanced 5-Axis

ALPHACAM's Advanced 5-Axis additional module seamlessly integrates 4 and 5-axis simultaneous machining within its machining environment to allow a range of multi-axis cutting strategies to be applied to the most complex tooling or components

ALPHACAM's Advanced 5-axis module offers a wide range of 4 and 5-axis strategies applicable to solid and surface geometry.

ALPHACAM's Advanced 5-axis module has now made this easier to use with the operational style interface yet still have all the control required for the higher demands such as:

- SWARF cutting for machining of variable taper walls
- 5-Axis finishing across multiple surfaces with control over lead/lag and side tilt angles
- 5-Axis profile machining for slotting, de-flashing and trimming of sheet forms
- Full support for all common tool profiles, including lollipop cutters
- Easy-to-use machining strategies are geared to maximise productivity and quality

4 and 5-axis simultaneous machining offer key advantages over conventional indexed 3-axis machining:

- Improved surface finish and extended tool life are achieved by orienting the tool to maintain optimum tool-to-part contact at all times
- Improved access to undercuts and deep pockets - through tilting the tool or component allows shorter series tooling to be employed, eliminating the need for secondary setups
- Reduced fixturing, as the cutter can be presented to the component at any required angle
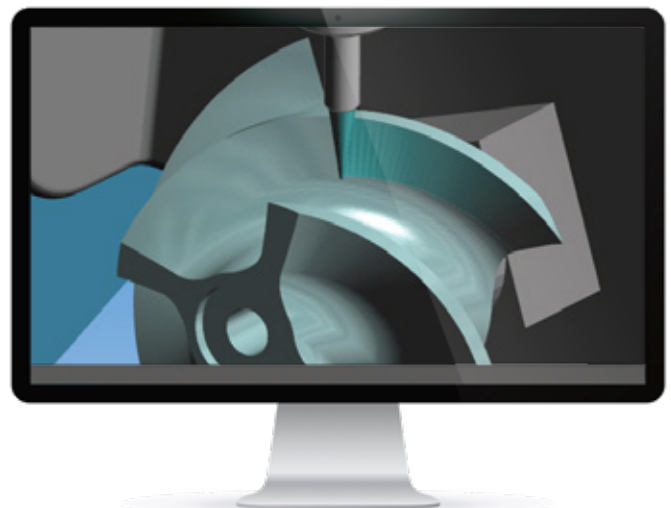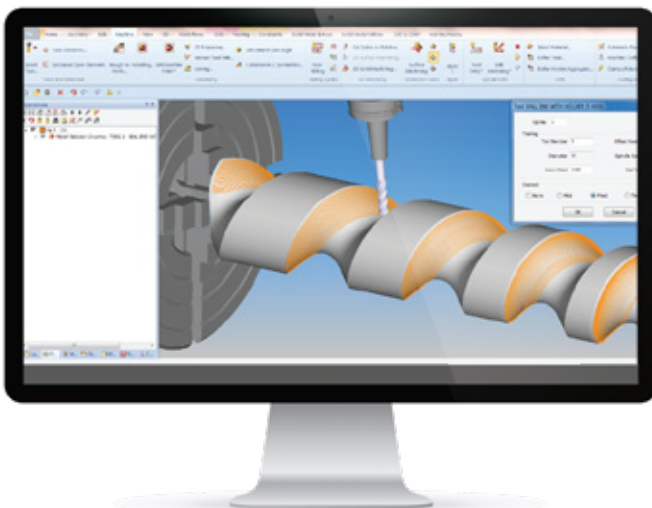
ALPHACAM | Designer

ALPHACAM | Designer fills the gap between CAD and CAM.
From model design to part repair & modification,
ALPHACAM | Designer is the ultimate CAD solution for
taking geometry through to manufacture

Direct modelling

Direct modelling frees the user from the constraints of
a traditional modelling system. Rather than modifying a
lengthy series of parameters to make a design change,
direct modelling allows the user to push, pull and drag the
geometry to obtain their desired shape.
These changes can be completely freeform or driven
by numeric increments and measurements taken from
existing geometry.

Knowledge of how the original model was constructed
is no longer necessary and design changes are not
constrained to the original methods of creation.
Direct modelling gives the user complete freedom of
construction whether creating a new component or
modifying an existing design created in any of the myriad
of CAD formats that ALPHACAM | Designer supports.

Ease of use

Simple menu and icon commands with context sensitive
online help make it quick and easy to start using
ALPHACAM | Designer. Dynamic rotation, zoom and pan,
together with programmable function keys and mouse
buttons help speed up the operation of the software.
Unlimited undo and redo operations with user definable
bookmarks enable the designer to move backwards and
forwards throughout the design process. Multi-layer and
multi-origin control with user definable colour pallets
and line styles makes it easy to review, create and work
with very complex designs. Lightning fast rendering,
transparency control and dynamic sectioning make it easy
to visualise CAD files and large assemblies.

Model healing

Small gaps between surfaces on imported models can
be automatically healed preventing the time-consuming
process of rebuilding very small surface patches. Where
surfaces are corrupt or missing ALPHACAM | Designer will
automatically create the edge curve geometry making
it easy to rebuild new faces using the comprehensive
surfacing suite. Automation makes the time-consuming
process of model clean-up much faster and simpler.

Closing a surface model to produce a solid body eliminates
construction problems later in the design process and
immediately brings the benefits of solid modelling to you.

The ability to seamlessly switch between solid and surface
technology provides unlimited freedom, ensuring you can
work with difficult CAD data.

Feature suppression

Frequently the incoming CAD data includes geometric
features that are either unnecessary for CAM, or will not
be created by the machining process itself. While this was
important for the CAD design and will ultimately reside in
the final component, such features often impede the job
of the CAM programmer.

With ALPHACAM | Designer, removing these markings and
even saving them for later operations is just a mouse
click away.

> **I looked at many systems before
> selecting ALPHACAM, but I made
> the best choice, and if I had my
> time over again I would select
> it again."**
>
> **Budd Boulton,**
> Quick UK

Model simplification

Along with suppressing certain features of the model not used for machining, you may wish to simplify the geometry during various stages of the machining process. Removing portions of the model, such as intersecting features, makes the machining process faster and provides better results. The ability to modify the model without being held to the constraints of a previous construction method or feature tree is incredibly powerful.

Creating model variations for each stage of the machining process becomes simple and your machining results become both fast and of higher quality.

Powerful sketching

ALPHACAM | Designer's sketch capabilities allows for the creation of two-dimensional shapes using free form input. While you can rely upon the traditional methods of coordinate-based input, free form sketching intelligently interacts with surrounding geometry. This ability to intuitively create implied constraints with other geometry expedites the sketch creation process while maintaining the maximum flexibility for future changes.

Geometry for machining

ALPHACAM | Designer provides a host of geometry creation techniques that are critical to the machinist for model preparation. Hole capping is a great example of the simple and easy to use features of ALPHACAM | Designer that help to ensure that surface machining provides the best possible results. This feature can be used to cap anything from a simple drilled hole to a complex open cavity with just a few clicks of the mouse. An extensive range of curve creation routines vastly improves boundary creation and simple but powerful surface creation techniques provide the machinist with more power than ever before.

Working with 2D data

ALPHACAM | Designer supports the import of DXF and DWG files allowing the user to transform existing 2D data into a 3D model by simply reusing the imported profiles from the original data. Imported data automatically creates sketch profile regions making the transformation from 2D to 3D easier than ever.
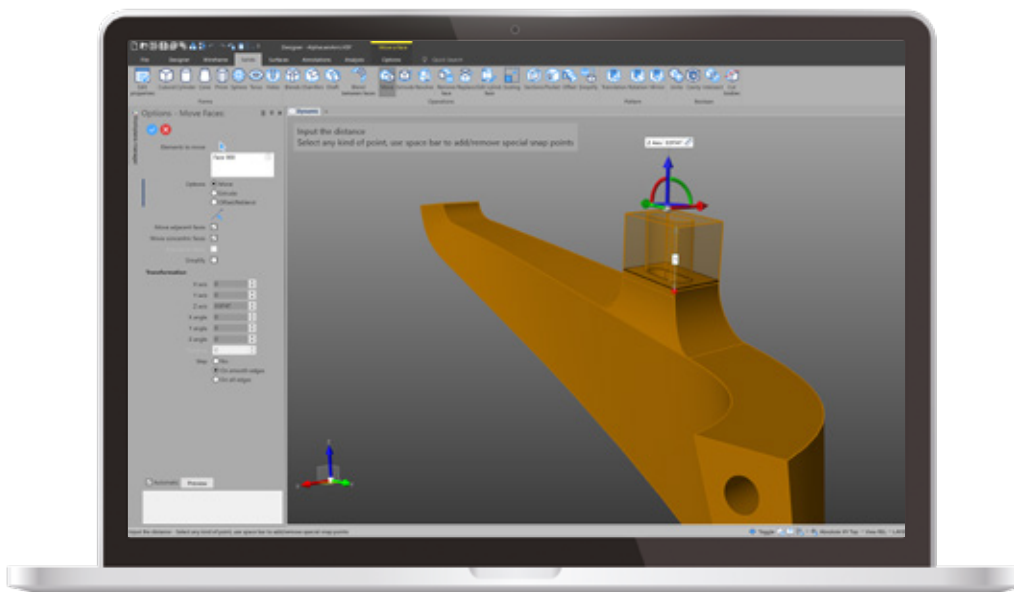
Software and support

The ALPHACAM team has a support network of engineers who understand your business through experience. We will guide you through the modules and recommend the most appropriate combination of software, training and services that suits your needs

Software that grows with you

ALPHACAM Essential

The ideal entry level product for basic 2D CNC work.

ALPHACAM Standard

The perfect product for shops and subcontractors.

ALPHACAM Advanced

Targeted at the manufacturer who works with complex, free-form patterns and tools.

ALPHACAM Ultimate

Adds support for full 4/5-axis simultaneous machining for high specification joinery and furniture manufacturers.

Support plan

The financial cost of unplanned downtime can be expensive and lead to additional costs to your business. We understand it's essential to maximise productivity, which is why our support plans are specifically designed with your success in mind.

Support portal

A highly efficient tool for contacting our experienced and knowledgeable Technical Support Team. It shows the status of current and previous cases and gives access to a comprehensive knowledge base.

eSupport

Enables our Technical Support Team to view detailed information via email relating to your queries, for a rapid and accurate response.

Telephone support

Provides direct telephone contact to the Technical Support Team, for resolution of more involved issues.

Web rescue

A direct PC to PC service allowing our Technical Support Team to resolve your issues directly.

Software updates

Receive annual software updates giving you the latest functionality and ensuring maximum productivity and efficiency.

HEXAGON

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit hexagonmi.com.

Learn more about Hexagon (Nasdaq Stockholm: HEXA B) at hexagon.com and follow us @HexagonAB.