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N3 G00 G42 X0 Z5.
N4 G01 Z0 F0.2
N5 X20.
N6 Z-20.
N7 X30. W-15. S1100
N8 G1 W-20. R3.
N9 G1 X50. K-3. S700
N10 G01 Z-70.
N11 G02 X90. Z-90. R20. S360
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SprutCAM

CAM Software Solution for Your Manufacturing Needs

SprutCAM is a CAM system for NC program generation for machining using; multi-axis milling, turning, turn/mill, Wire EDM numerically controlled machines and machining centers. The system enables the creation of NC programs for machines with a wide variety of kinematics and can be adjusted to NC equipment of virtually any kind.

SprutCAM's advanced functionality and its wide range of available features enables the efficient machining of dies, press tools, casting molds, preproduction models, master models, machine parts, original and mass production parts, basic parts, spare parts, wooden parts, templates, engraving of inscriptions and images.

EQUIPMENT

The calculation of CNC tool-paths within SprutCAM is carried out taking into account the kinematics (structure) of the selected NC machine. Using this method, the tool-path calculations for machines with a wide variety of configurations are easily undertaken and the existing machining operations do not require any further editing, simply select the required (alternative) NC machine.

In addition to integrated NC devices such as lathe steady, tail-stock, revolving table, various fixtures and tooling equipment can now be integrated within the kinematic scheme for an NC machine.

Today, the SprutCAM equipment library contains a wide variety of market leading NC machines.

A new machine configuration can be created based upon an existing library machine configuration.

New types of tools for 'undercut' machining are added:

- *circular groove cutting,*
- *sharp and rounded edge double-sided chamfer,*
- *replaceable-insert double-sided chamfer.*

FBM Shaped cutters.

In FBM the ability to use shaped tools created by the end-user is added. Thus, if the machining of any feature type requires a special tool which does not exist within the system, the user can draw the parameterized tool contour and save it as a new type of tool.
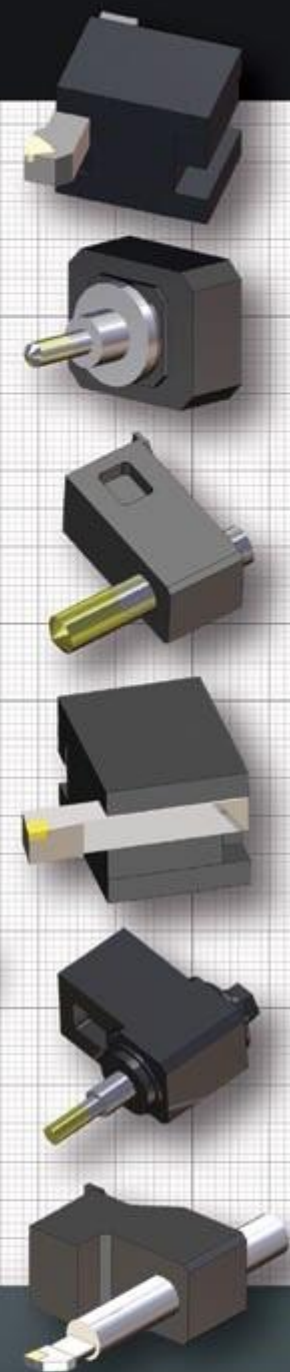
TOOLING

Different knife cutting tools can be combined into a tool library or user defined libraries that can be associated with a corresponding machine. It is possible to use tool libraries provided by tooling suppliers. The user can further modify these to suit the particular requirements of a machine or for a particular task.

By using this QR code, you can install SprutCAM Brochure application onto your smartphone.
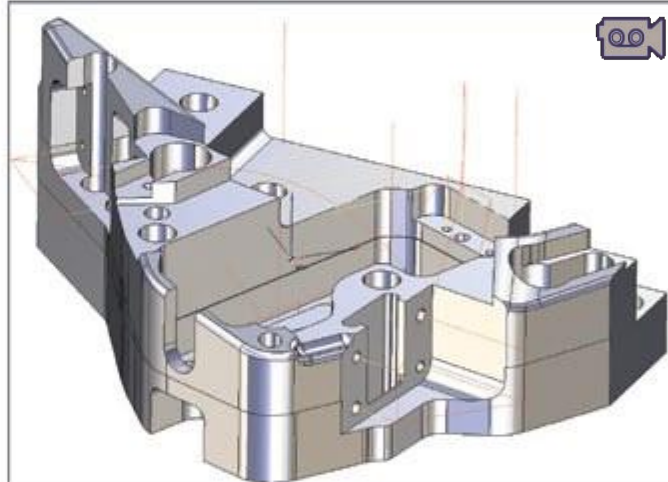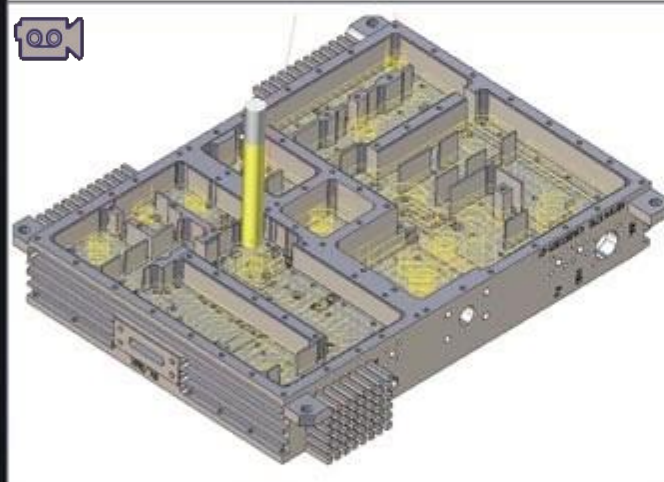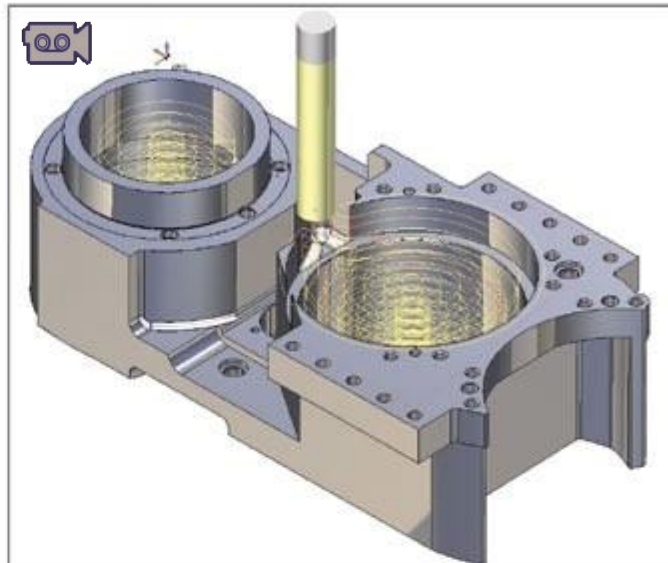
Move the lens of smartphone onto the pictures of this brochure marked with a sign:

The drawings come to life on the screen!

2.5D MACHINING

SprutCAM features several 2.5D machining strategies for the machining of multi-level 2D parts. Available strategies include calculations for roughing and finishing tool paths. Machining parts of any level of complexity is achieved using strategies for machining: along a contour, island machining, vertical walls, slots & pockets with islands. SprutCAM has the ability to automatically recognize horizontal surfaces as well as holes. The system supports all types of hole machining including tapping and thread milling. The automatic recognition of rest material and the full control of machining accuracy is included.

New in SprutCAM

"Stepover by scallop height" Milling type

Allows the milling of 3D curved surfaces using a constant step height

Facts and figures

Over 600 post-processors

More than 500 kinematic schemes

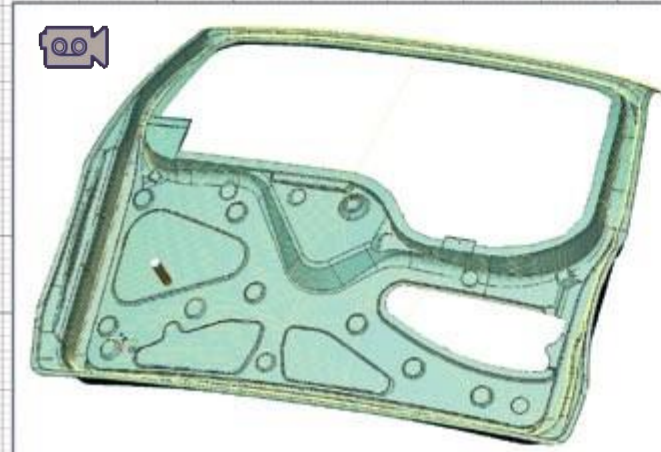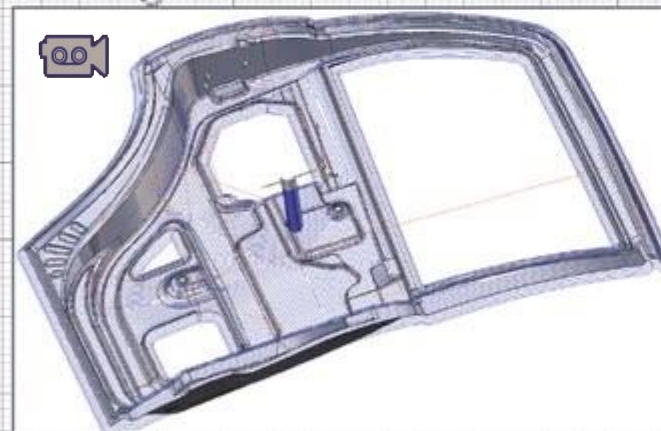*80 resellers worldwide*

*10 localization languages (including main European languages, Chinese, Japanese, Korean)*

SprutCAM includes a wide range of 3D machining strategies which enables the machining of parts with complex freeform surfaces using both conventional and high speed. The user has the capability to create tool paths that are defined by the scallop height; which ensures achievement of the required surface accuracy and quality. A real labor saving feature is the automatic recognition of remaining material for rest milling. The wide range of available strategies for roughing and finishing provides high quality machining for 3D parts.
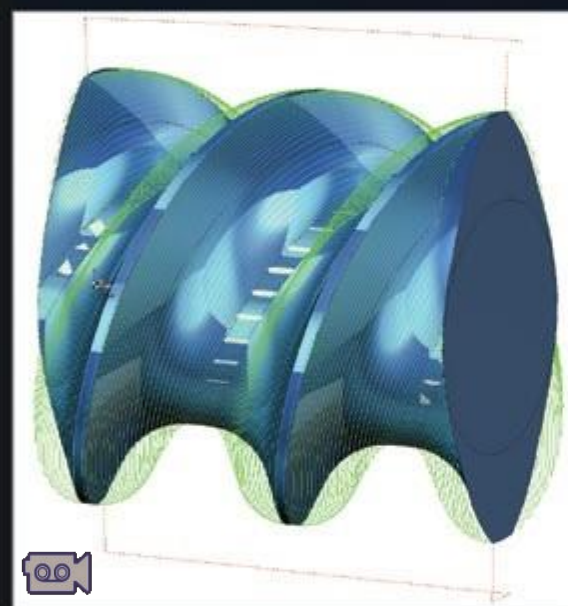
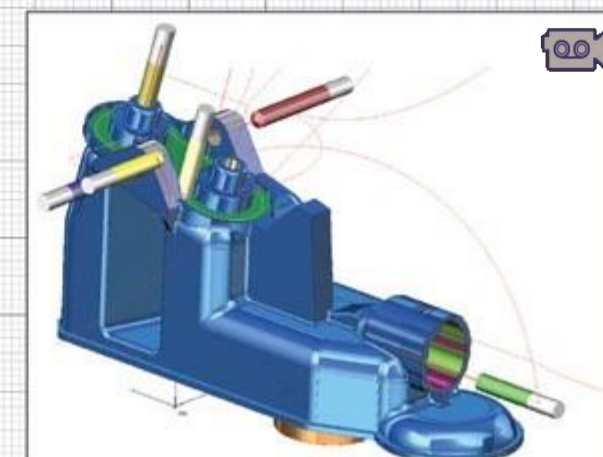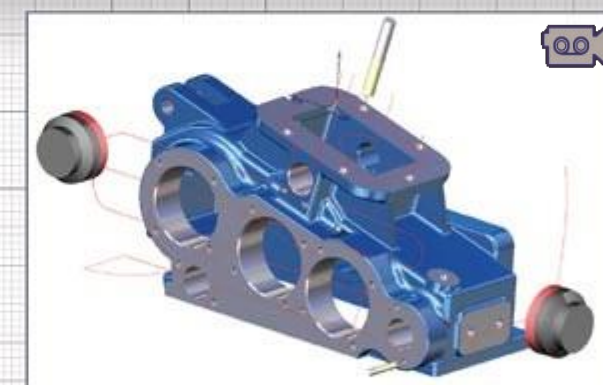# 3D MACHINING
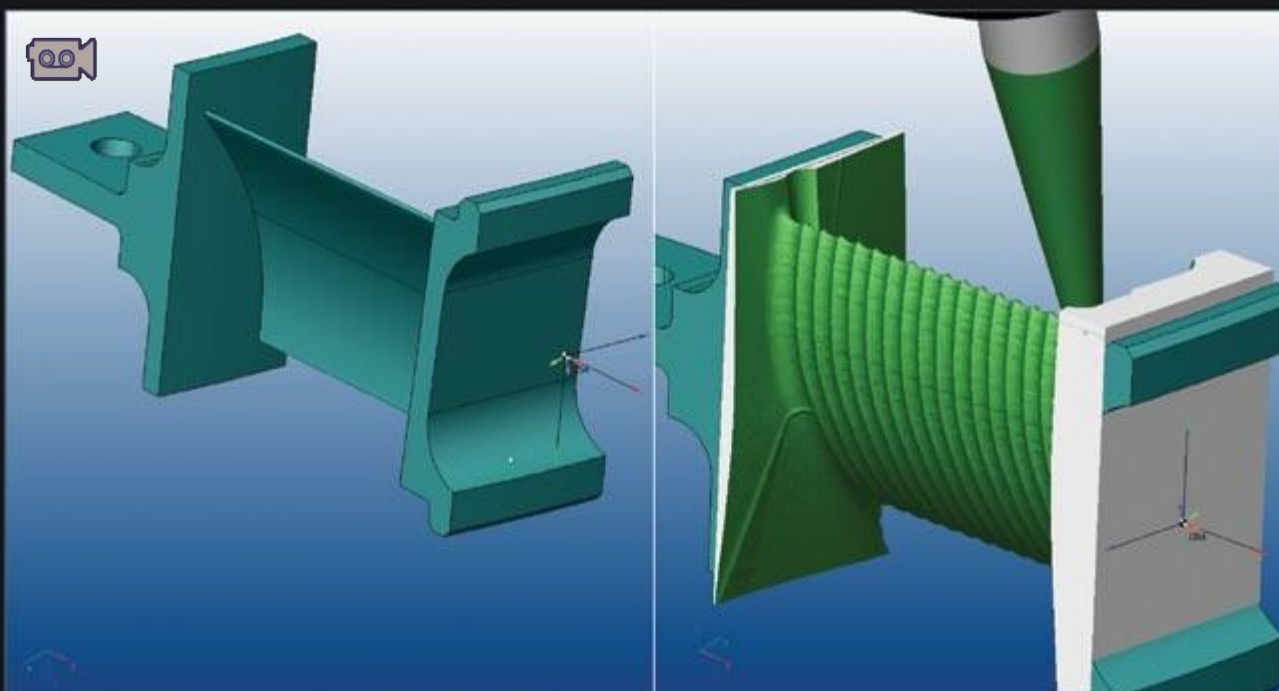
4-AXIS ROTARY

MACHINING

Rotary machining within SprutCAM is a milling process that, when a linear movement is aligned with one of the standard axis X, Y, Z, it can be transposed into a rotational movement. This method of machining is ideally suited for the machining of; axles, crankshafts, camshafts, oil-well and gas industry tooling equipment, augers. Rotary machining reduces the complexity of manufacturing parts while increasing the quality by eliminating positioning errors between part set-ups. SprutCAM contains a wide range of strategies for the calculation of rotary machining programs.

MULTI - AXIS INDEXED MACHINING

When doing multi-axis machining, the required rotation angle of the part can be applied interactively by simply clicking on the required part of the 3D model surface, which will automatically orientate the tool / part. SprutCAM automatically calculates the necessary rotation angles and generates the NC program. The tool path is calculated taking into account the predefined machine kinematics (structure) for index machining for 4-5 and more axes. Multi-axes machining comprises 2.5, 3 and 4 axis milling strategies. NC programs are calculated taking into account any transformations of the working CS. To carry out machining of the same part on a machine with another kinematics scheme, it only requires selection of the required machine and recalculation of the existing operations.

Multi-axis machining significantly reduces the number of required processes, improves the quality of machining while labor involvement is also reduced.

5-AXIS CONTINUOUS MACHINING

SprutCAM has strategies for 5-axis machining that allows the development of control programs for all types of multi-axis milling machines, including multi-task machining centres. The NC program is created taking into consideration the CNC machine model which enables collision avoidance of any type during machining. SprutCAM fully supports toolpath calculation based on rotating coordinate systems e.g. TCPM. SprutCAM includes market leading strategies for collision avoidance and full control of tool orientation.
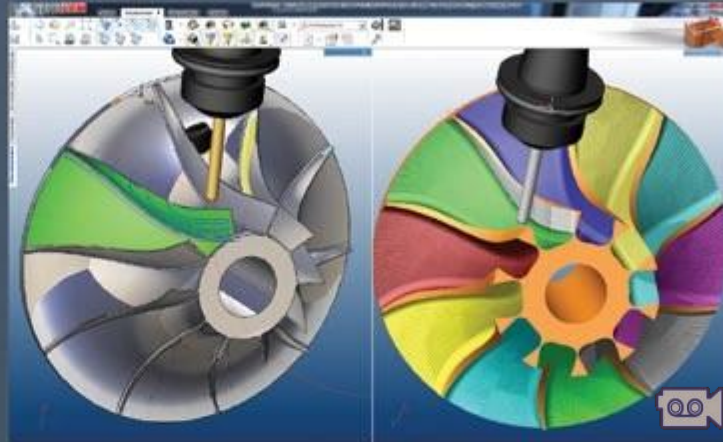
MULTITASK MACHINING

Programming of multi-task turning center with sub spindle(s) / turret(s) is available in SprutCAM (MTM). This makes it possible to generate NC programs for concurrent machining (all turrets / spindles) of several parts using multiple tools.

Facts and figures

SprutCAM is the leader in the North American market *(in the category of Tier-Price, according to 2013 – CNCCookbook, Inc.)

SprutCAM has headed the TOP-10 of the fastest growing CAM vendors in the world market for 2013 *(according to the 'CAD/CAM/CAE Observer' analytical magazine on the basis of CIMdata)

New in SprutCAM

High-speed milling in waterline roughing operation is improved. Smooth path and smooth transition are formed based on a constant cross sectional area of material removal.

HIGH SPEED MACHINING

SprutCAM milling strategies include features for creating 'High-Speed' milling tool paths. Trochoidal 'penetration' tool paths, smoothing of sharp corners, arc approach and retraction. These all help to ensure smooth tool paths and a consistent area of cut, which, together with the calculated lead in / out moves enables the use of high-speed milling. All of these features help to reduce the dynamic stresses which are placed on the machine during the high-speed machining process.
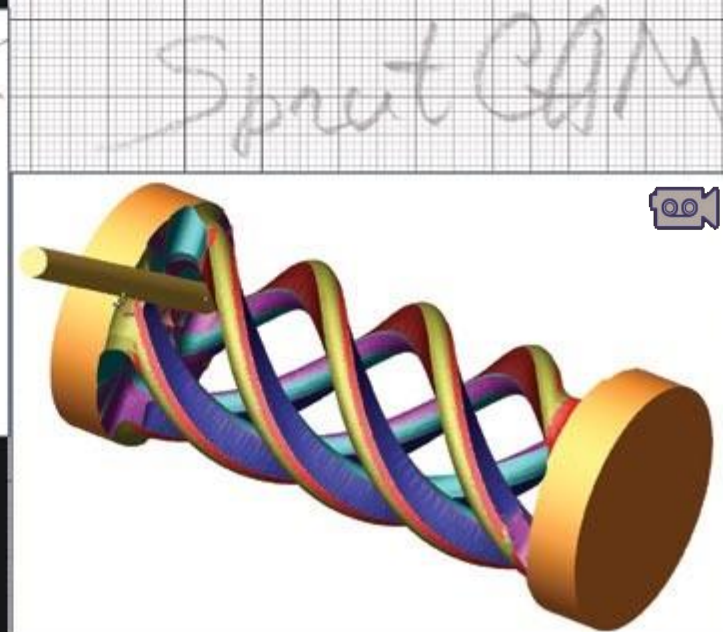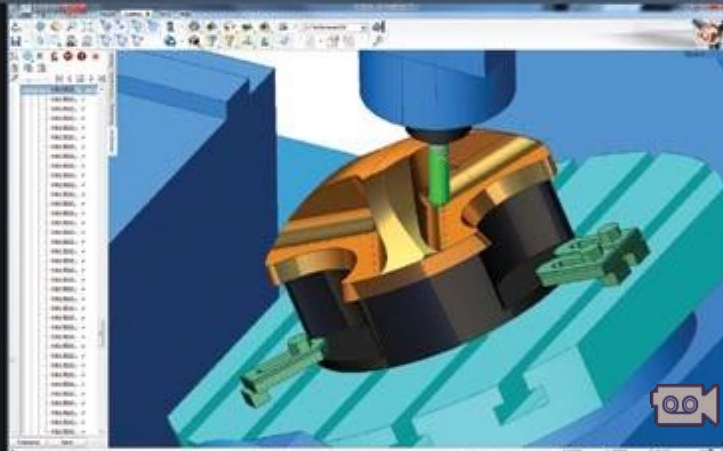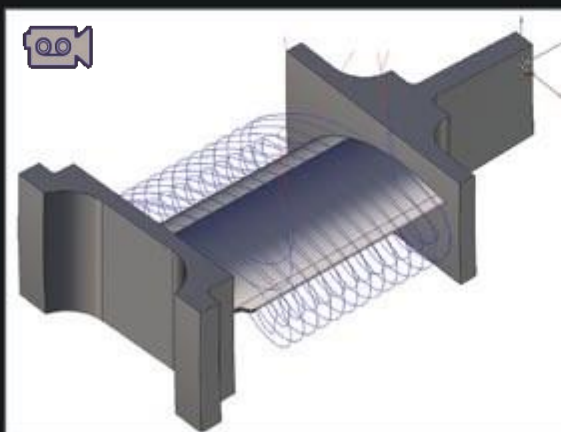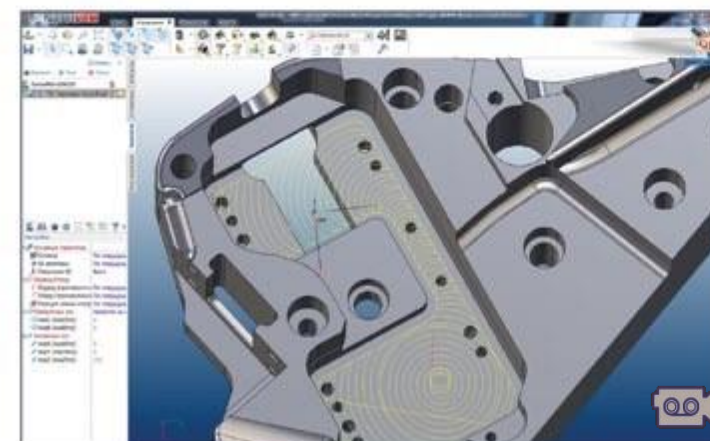
LATHE

SprutCAM includes a full range of strategies for the turning of both simple and complex parts. Included are rough and finish turning and boring (both radial and axial) operations, grooving, axial bore machining and threading of all types are standard. SprutCAM supports all known turning cycles. It is also possible to program lathes with a 'live' B axis. All tool paths can be calculated taking into account any remaining material. Machining options are set automatically based on the selected tool library. SprutCAM enables the control of any 'driven' feature of the machine: steadies, tail-stock, chuck, parts catcher etc.

TURN/MILL MACHINING

SprutCAM enables the creation of NC programs for all types of turn/mill machines. Machines can be programmed with any number and arrangement of turrets equipped with driven tools using the C, Y and B axes. CNC machine tool types that can include tooling systems with any tool position (turret / holder) and number are supported; hence, the NC program can include a combination of both lathe and milling abilities. All strategies for the lathe and 2.5-5 axes milling machining are available. Synchronization of turrets on Multi-turret machines is also available.
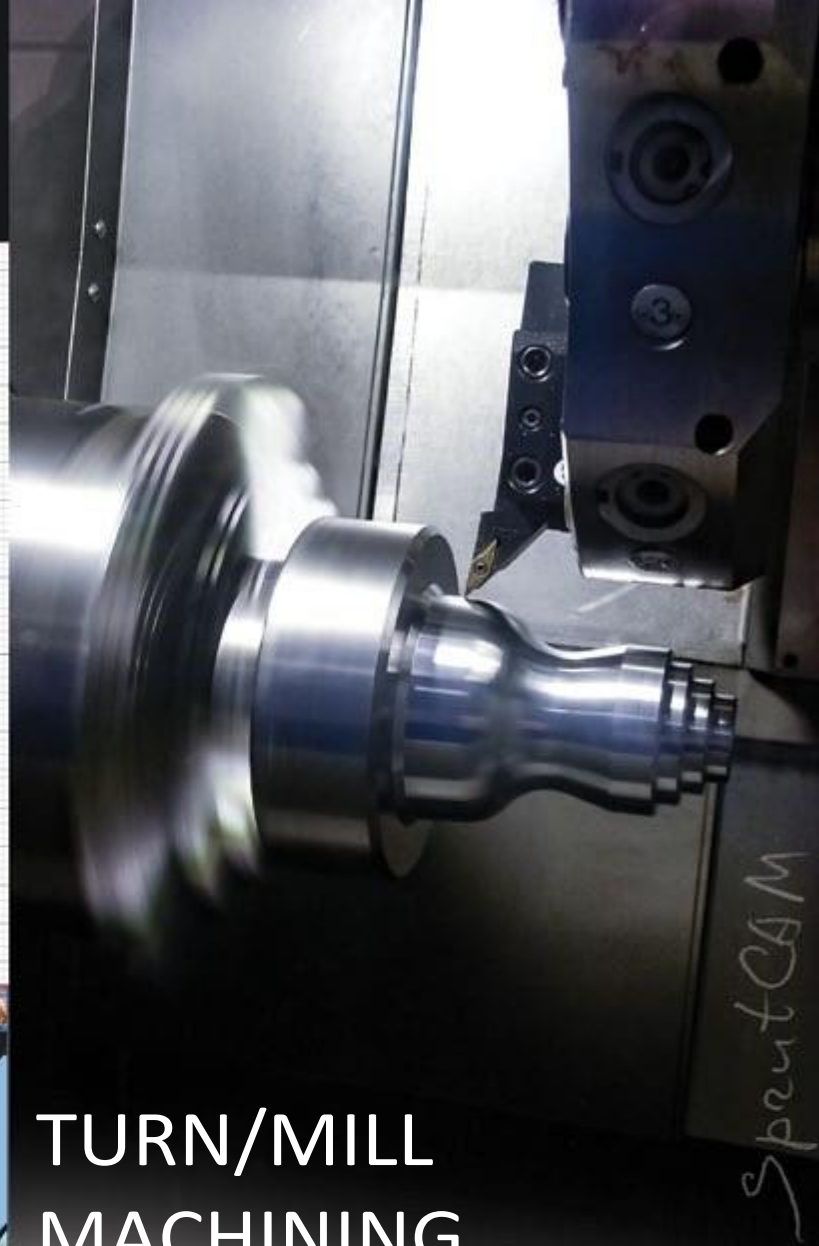
New in SprutCAM

"FaceMilling" operation. *Multi-level automatic milling of flat end surfaces of the workpiece.*
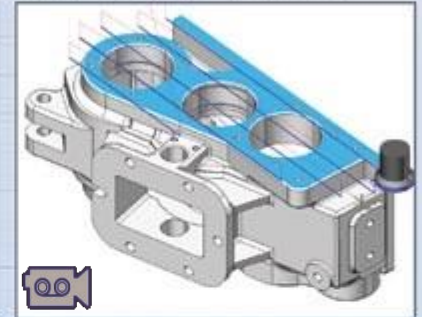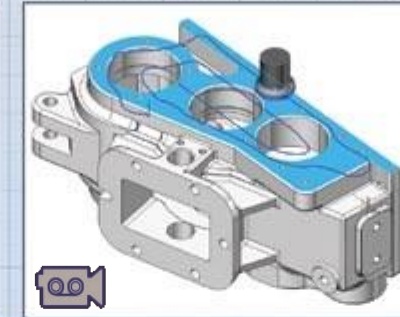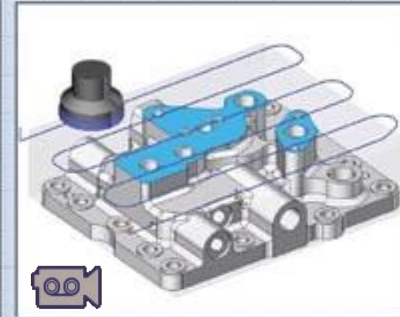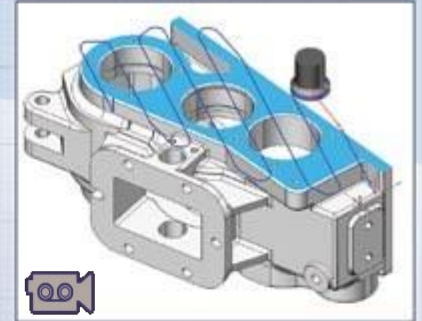
WIRE EDM

SprutCAM wire EDM operations enable the creation of 2 axis internal and external vertical contour machining. There are also 4-axis machining strategies with automatic, interactive and precise synchronization working with either 2D (curves) or 3D models. A cutting parameter databases can be defined for each individual machine and the many possibilities for multiple profile machining ensure excellent surface accuracy with minimum user input. Automatic, interactive and precise placement of 'bridges' for connected features prevents parts dropping out of the material. Hole position for wire feed are transferred to the holes machining operation in order to create the NC program for hole drilling.

Facts and figures

2014 – a new SprutCAM training center in the USA was opened.

2015 – a new SprutCAM training center in Germany was opened.

Throughout the world, a new copy of SprutCAM is installed every 40 minutes.

CUTTING

SprutCAM has a module for sheet material cutting (profiling). Users have complete control over the sequence of the machining strategies and operations. Bridges can optionally be placed in order to reduce the risk of deformation of thin parts and avoid break-offs. Rapid moves of the cutting head can be specified to be only above areas of scrap / waste material.
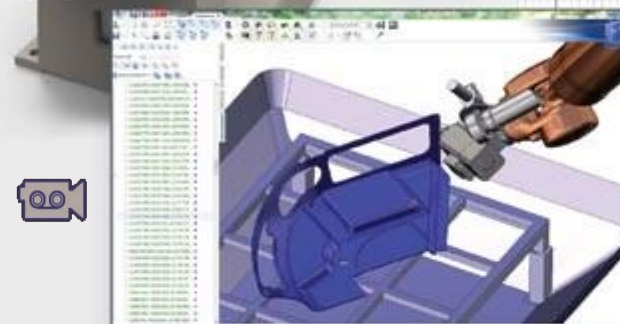
SprutCAM enables the development of NC programs for plasma, laser, OXY-FUEL and WaterJet cutters.

"Knife cutting operation" allows knife cutting the edges of curvilinear 3D surfaces with constant orientation of the knife along the cutting line. For example, for cutting cast interior parts of the car from soft materials.

New opportunities in 'Feature recognition' processing. Automatic recognition of grooves within holes added. The following strategies for grooving are now available: drilling cycle, rough and finish milling grooves, chamfering grooves all linked with the automatic Feature recognition of structural elements.

MACHINING ON INDUSTRIAL ROBOTS

SprutCAM - work integrated environment that allows to develop NC programs for a variety of types of machining using industrial robots. The system comprises the following machining modules:

- Milling;
- Plasma arc cutting;
- WaterJet cutting;
- Laser cutting;
- Knife cutting;
- Welding (arc, laser);
- Surface grinding;
- Deburring edges of details;
- Area cladding;
- Thermal strengthening of the surface.

The calculation of the tool path along part features is made while taking into account:

- Robot kinematics;
- Singularity area;
- Coverage area;
- The range of allowable angular rotation of the joints of the robot;
- Collision control;
- Control of additional axes of the robotic cell.

The Robot control program is generated taking into account the currently selected robot type. SprutCAM outputs the technological commands inherent to the selected robot type within the created control program.

AUTOMATIC FEATURE MACHINING BASED ON THE PART MODELS STRUCTURAL ELEMENTS

SprutCAM makes an opportunity of automatic formation processing technology on CNC machines based on engineering and design elements of the 3D model. Formation of technology involves three stages:

- FBM recognition standard;
- Sorting and formation of machining operations by defined conditions (by features, by plane and tool, etc.)
- NC generation

In the 'robot axes map', control over encounters with any features of the cell; fixtures and non-machining workpiece area, is added.
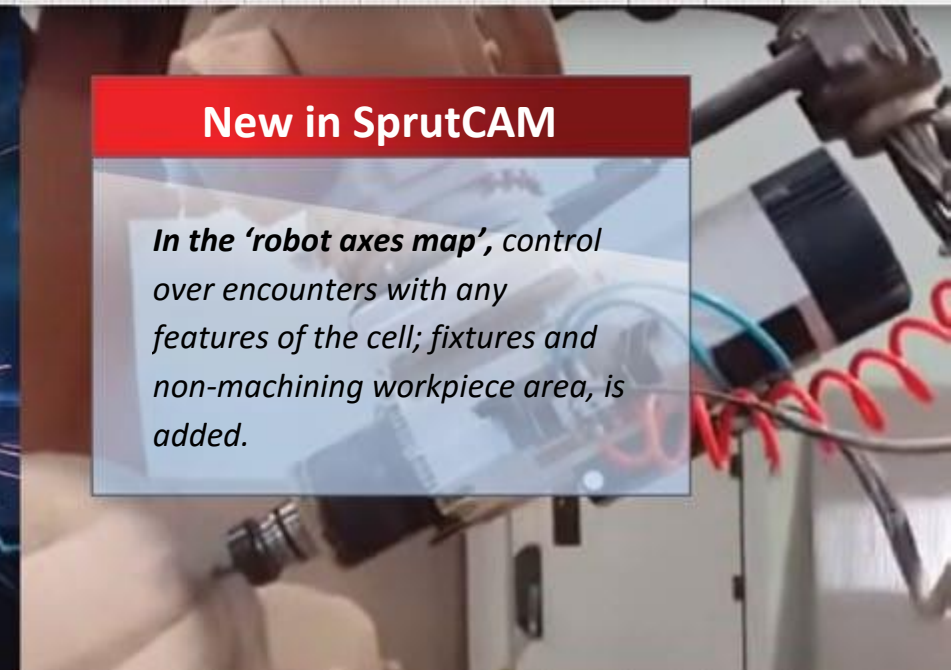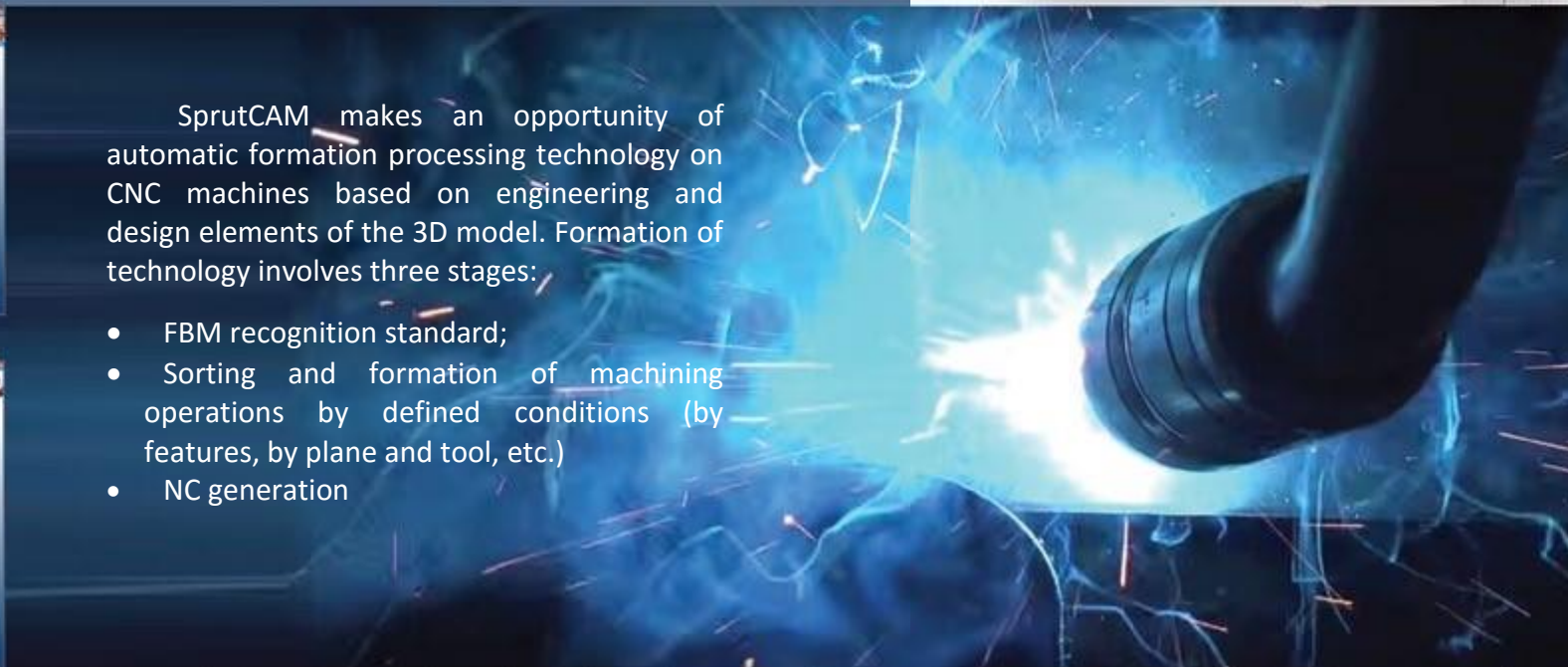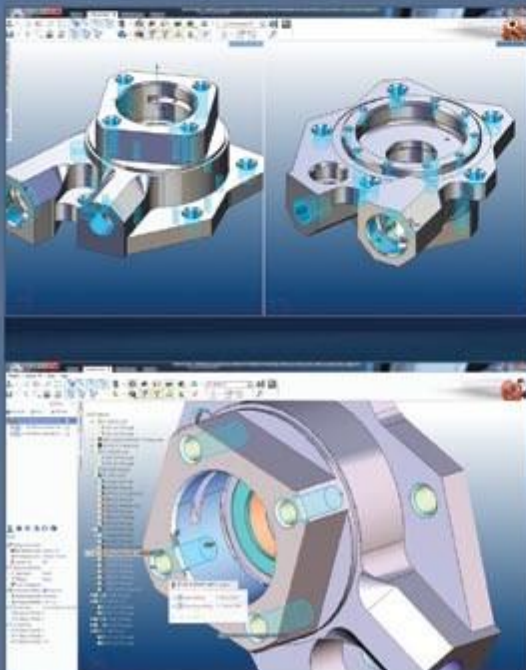
MACHINING SIMULATION

SprutCAM includes a powerful machining simulation module, which allows the user to simulate the machining of the part using any machine already installed within SprutCAM; using the full machine kinematics and 3D model. The machining simulation enables the machining technology to be optimized for maximum efficiency, tooling and machine life etc. While simulating the machining process, SprutCAM automatically takes into account both the machine and auxiliary equipment travel limits. The standard SprutCAM installer includes a variety of machines for practically all types of metal-cutting machinery.

New in SprutCAM

Advanced collision monitoring. All types of collisions are checked for, not only cutting tools, also toolholder, adaptors, reduction sleeves, etc. are all monitored.

Function of automatic collision avoidance is added for obstacle avoidance by the tool axis.

Associativity support of 3D model import in STEP or Parasolid formats. If an already used 3D model is edited outside of SprutCAM and re-imported into the project. This is automatically 'matched' with the existing project model, so no re-selection of model features is required.

New in SprutCAM

20 stands annually at trade shows and events worldwide.

More than 3000 commercial users worldwide.

More than 3000 learning licenses installed in educational institutions worldwide.

Machine module simulation is:

- Multi-axis machining simulation taking into account the movement of all the axes of the machine according to its kinematics scheme;
- Realistic machining simulation;
- High authenticity of the machined part model allows visual examination of the machining quality to detect possible problem area's;
- Visualization of zones with remaining material and gouges, e.g.: in case of negative stock or low precision machining;
- Comparison of the machined part to the original model;
- Visual control of the remaining material;
- Control of the tool radius and length during the simulation.

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