



SPRUTCAM X
WORLD CONFERENCE
2023

SprutCAM X 17:
The World Premiere

3 000 000

lines of code

18 627

unique users

810 539

launches

13 069

trial licenses

2 127

new commercial licenses in 2022

SprutCAM X: CAD/CAM for next generation makers

Enjoy the power/speed/safety of a natural
easy-to-learn CNC programming workflow



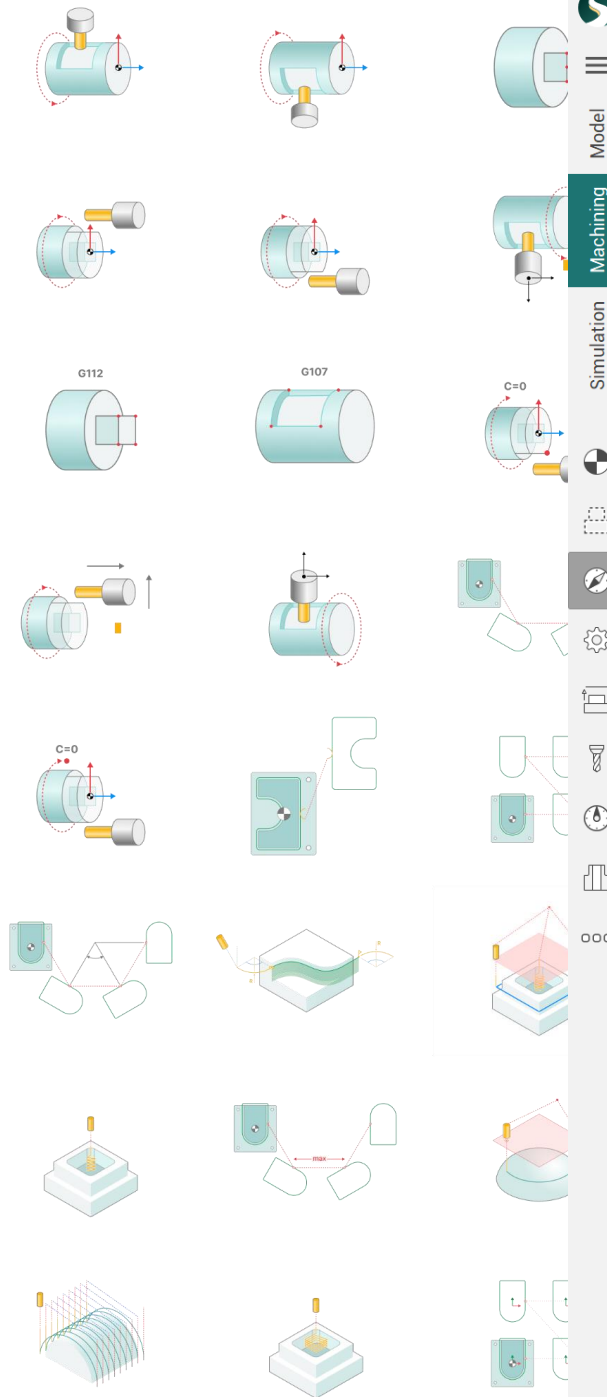
SprutCAM X Robot: all-in-one CAD/CAM/OLP for robots

Experience the innovative all-in-one software
suite for complex and creative robotic tasks



Features design SprutCAM X

New hints and interactive
smart hints to quickly
navigate the parameters



New project

Machining New operation ▾

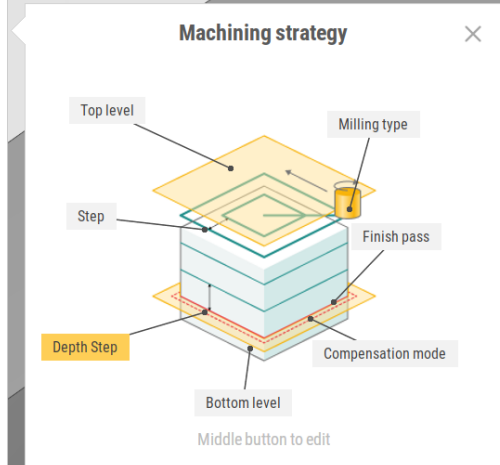
Links Run Reset Parameters

DECKEL MAHO DMU70

Roughing waterline 1 T#11 20mm Cylind

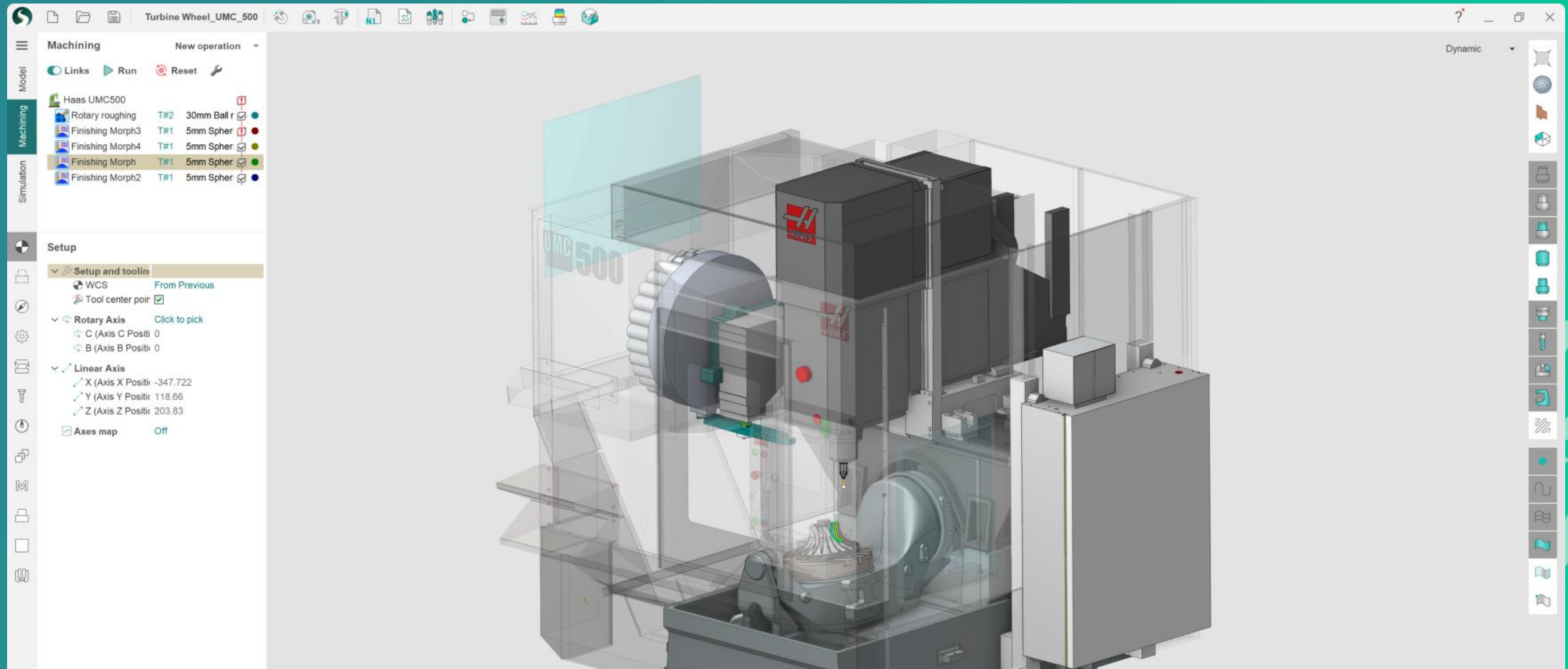
Strategy

- ▾ Machining strategy Equidistant ▾
 - Step 50 %Ø (10 mm)
 - HSC step
 - Milling type Both
 - Finish pass
 - Finish rounding radii 0 %Ø (0 mm)
 - Rough rounding radii 0 %Ø (0 mm)
 - Linking radius 10 %Ø (2 mm)
- ▾ Machining levels
 - Top level 1 mm
 - Bottom level 0 mm
- ▾ Depth Step 100 %Ø (20 mm)
 - Step up Off
 - Relief angle 0 °
- ▾ Clear flats
 - Flats on finish feed
 - Cleanup height
- ▾ Sorting By cavities
 - Downwards Only
- ▾ Trimming
 - Hole capping
 - Trim waste rolls



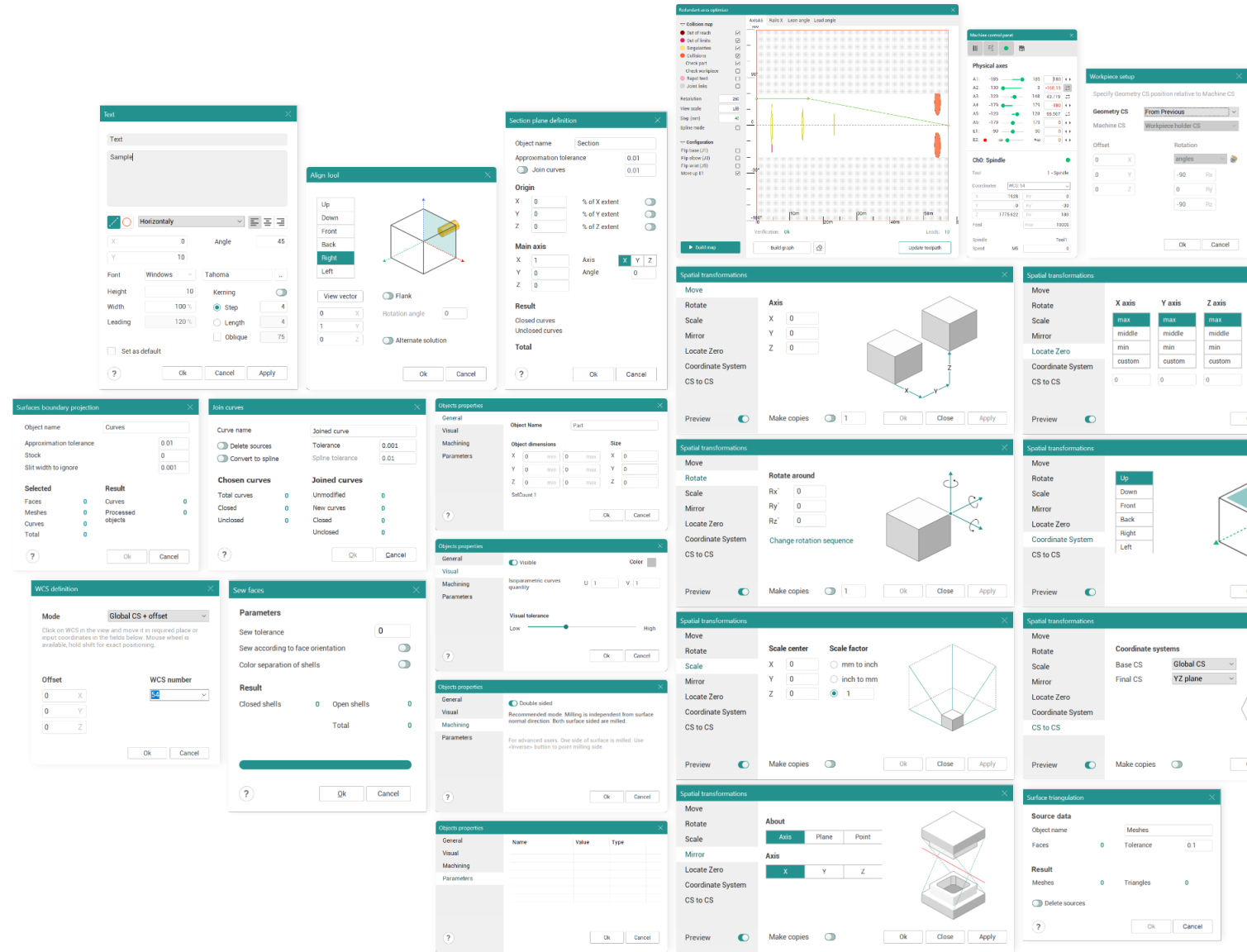
Features design SprutCAM X

- One window for everything
- Everything you need is always at hand
- You are always in control of the process



Features design SprutCAM X

- Laconic and simple
- Nothing distracts from work
- Consistent workflow



Multiproject

The screenshot displays a CAM software interface with a multiproject simulation. The main window shows a 3D model of a part with blue and red toolpaths overlaid. The interface is divided into several panels:

- File Explorer:** Shows the current project file: `C:\Users\Public\Documents\SprutCAM X\Version 17\Projects\Examples\Milling\3D\Electrode.stcp`.
- Project Tree:** Lists the simulation components:
 - Mikron VCE600 Pro (3-a...)
 - 2D contouring T#1 04
 - Finishing waterline T#3 02
 - Roughing waterline2 T#2 00
 - Finishing optimized pl... T#5 0.5

The simulation control panel includes buttons for **Links**, **Run**, **Reset**, and **Parameters**. The simulation is currently running, as indicated by the **Run** button being highlighted.

The **Setup** panel shows the following configuration:

- Setup and tooling**
 - WCS: From Prev
 - Local CS: Off
- Linear Axis**
 - X (X axis position): 23
 - Y (Y axis position): -242.5
 - Z (Z axis position): 529

The 3D model shows a complex part with multiple holes and features. The toolpaths are color-coded: blue for finishing and red for roughing. The simulation is running on a Mikron VCE600 Pro machine using a MicroCut VM1300 tool.

Part	Tool	Material	Status
Part 1	G54		●
Adaptive roughing	T#1	MD133-12.0W€	●
Part 2	G55		●
Adaptive roughing ...	T#1	MD133-12.0W€	●
Part 3	G56		●
High speed roughin...	T#1	MD133-12.0W€	●



Multiproject

Features

- Simultaneous management of multiple projects
- Ability to open multiple projects in a single window or split SprutCAM X into multiple windows for multi-display workflow
- Seamless transfer of operations between projects
- Perform calculations in one project while simultaneously working on another

Benefits

- Streamlined workflow for time efficiency
- Simple reusability of similar approaches across multiple projects



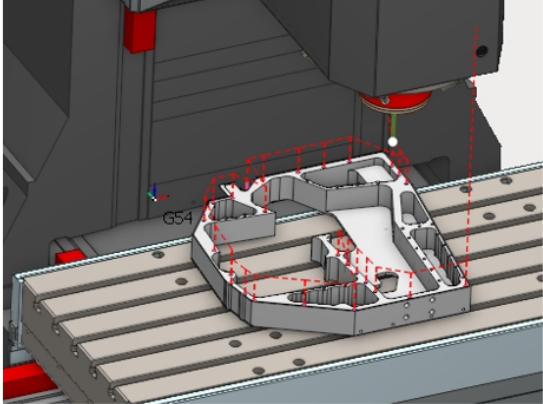
UNDO?



Snapshots

Project snapshots manager for project Mill 2D Pocket_Contour.stcp

State name	Created	Description		
Snapshot - 38 seconds ago	38 seconds ago	Before deleting "Hole machining 1"		
Snapshot - 44 seconds ago	44 seconds ago	After running "Pocketing 3"		×
Snapshot - 46 seconds ago	46 seconds ago	Before running "Pocketing 3"		×
Snapshot - 2 minutes ago	2 minutes ago	Before running "Hole machining 1"		×
Snapshot - 2 minutes ago	2 minutes ago	After running "Pocketing 2"		×
Snapshot - 2 minutes ago	2 minutes ago	Before running "Pocketing 2"		×
Snapshot - 2 minutes ago	2 minutes ago	After running "Pocketing 4"		×
Snapshot - 2 minutes ago	2 minutes ago	Before running "Pocketing 4"		×



- Haas VF-3
- Pocketing 1
- Pocketing 4
- Pocketing 2
- 2D contouring 1
- 2D contouring 2
- 2D contouring 3
- Pocketing 3
- Hole machining 1

Clear all

Load Close

Snapshots

Features

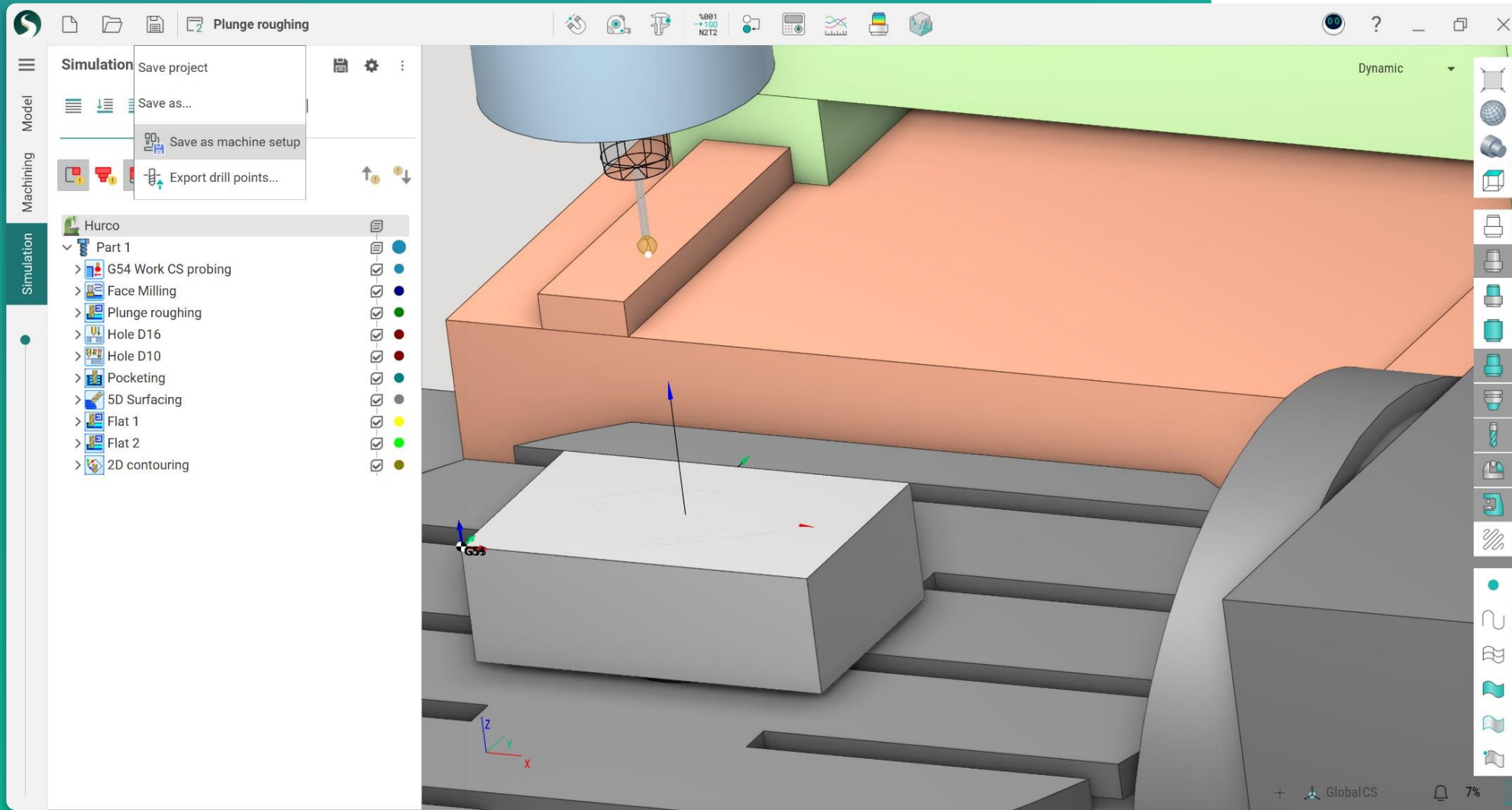
- Automatic creation of snapshots triggered by events
- Time-based snapshots disabled by default
- Rapid "Undo" functionality through the snapshots list
- Snapshot manager for convenient preview
- Automatic snapshots triggered before/after toolpath calculation and before delete operations

Benefits

- Enhanced safety while working on the machining project
- Swift restoration to the desired project state



Machine Setup File



Machine Setup Files

Features

- Create new project based on a setup
- Seamlessly transfer setups between machining projects

Benefits

- Easy and quick transfer of machine digital twins, settings, tools from a ready-made template

Content

- Machine
- Fixture with setup data
- Tool list
- Tool Blocks (for turret)
- Tools positions in turret
- Machine dimensions
- Auxiliary equipment status (on/off)
- Setup Stages and Parts from CAM tree



Machining Report

The screenshot displays a software interface for generating a machining report. The main window is titled "Reports" and contains a 3D visualization of a machining setup. A grey machine bed is shown with a green workpiece mounted on it. An orange workpiece is also visible, with two blue tool bits positioned on its surface. The interface includes a left-hand navigation pane with a tree view showing "Project", "Machine", "Setup 0", "Project tools", "MD133-12.0W5X06...", "Holes", and "Images". A central table lists parameters and their values:

Parameter ...	Value
Name	C:\Users\Public\Docum...
Details	1
Setups	1

Below the table is a toolbar with icons for 2D, 3D, and various viewing options. At the bottom of the window, there is a "Pattern" field with the text "\$(TEMPLATE_FOLDER)\default.odt", a "Save as PDF" checkbox, an "Expert mode" checkbox, and buttons for "Export XML", "Create", and "Close".



Machining Report

Features

- Fresh and intuitive user interface
- Advanced expert mode with extensive settings
- Fine-grained control over the graphic scene
- Export functionality to multiple formats
- Diverse selection of report templates

Benefits

- Report generation with only relevant content
- Swift generation of reports
- Obtaining high-quality images



ÉNCY



< BACK

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- 🔊 679
- 🔖 2

SHARE

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- 🖨️

ChatGPT Has Come for CAM Software

SprutCAM X now has a ChatGPT-based AI assistant that will not only explain your G-code, but explain to your wife why you're working so late. Seriously.

WRITTEN BY



Michael Alba

PUBLISHED

May 16, 2023

READING TIME

~2 mins



LISTEN TO STORY

And then ChatGPT came for CAM.

In its latest update, CNC machining software SprutCAM X added an AI assistant based on OpenAI's ChatGPT API. Its name is Éncy.

SprutCAM Tech, the Cyprus-based developer of SprutCAM X, says

ENCY

Features

- Explain the G-code generated as a result of post-processing
- Generate a G-code using a text description of the operations
- Write code in Python to create .dxf or .stl files
- Provide reference information for the industrial robot or CNC-machine when creating kinematic schemes in MachineMaker
- Answer any question from a SprutCAM X user, even not related to the operation of the software

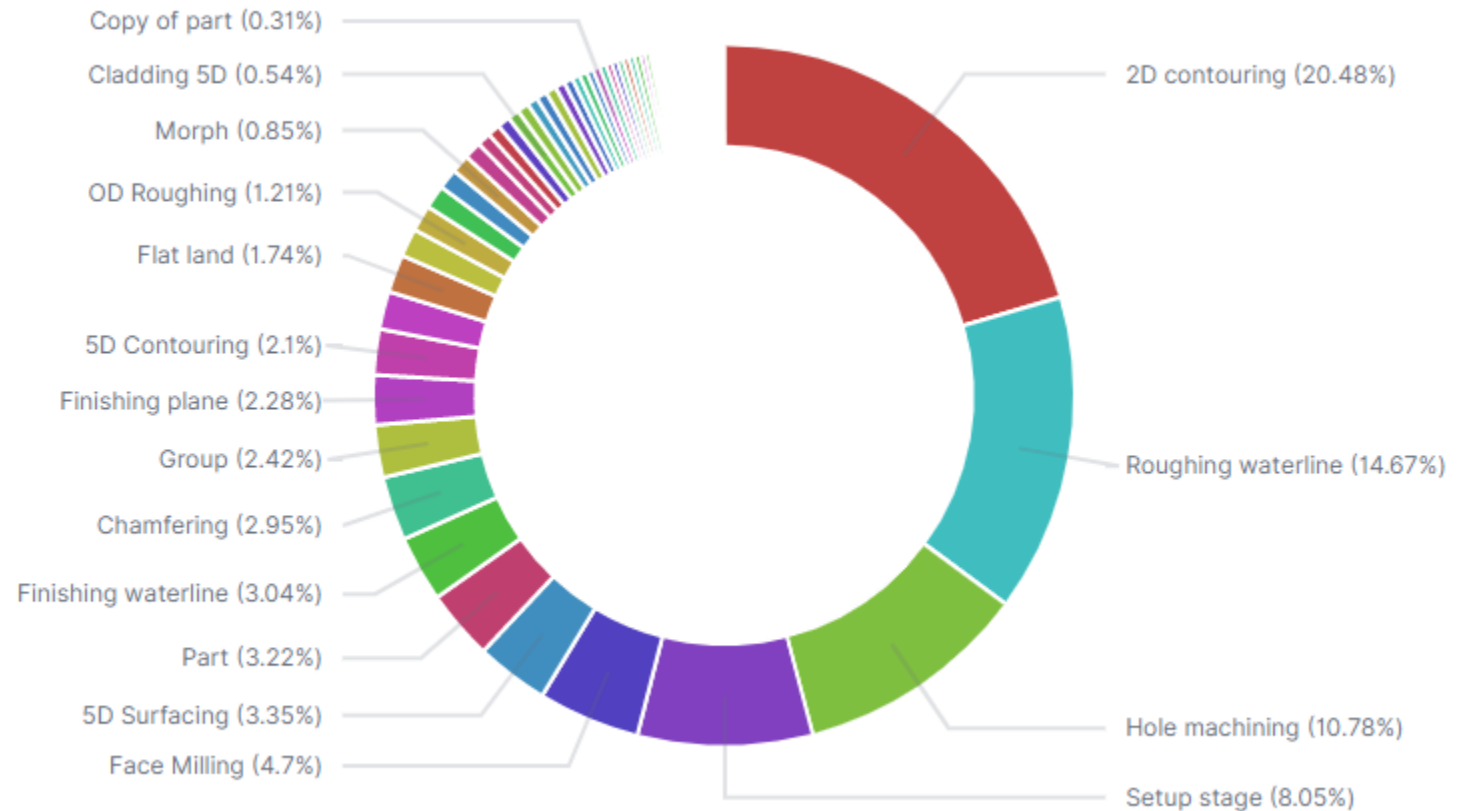
Benefits

- Introducing the revolutionary CAM AI assistant, a first in the industry
- A showcase of SprutCAM Tech's pioneering role in advanced technologies
- Unlocking new learning possibilities for G-code proficiency

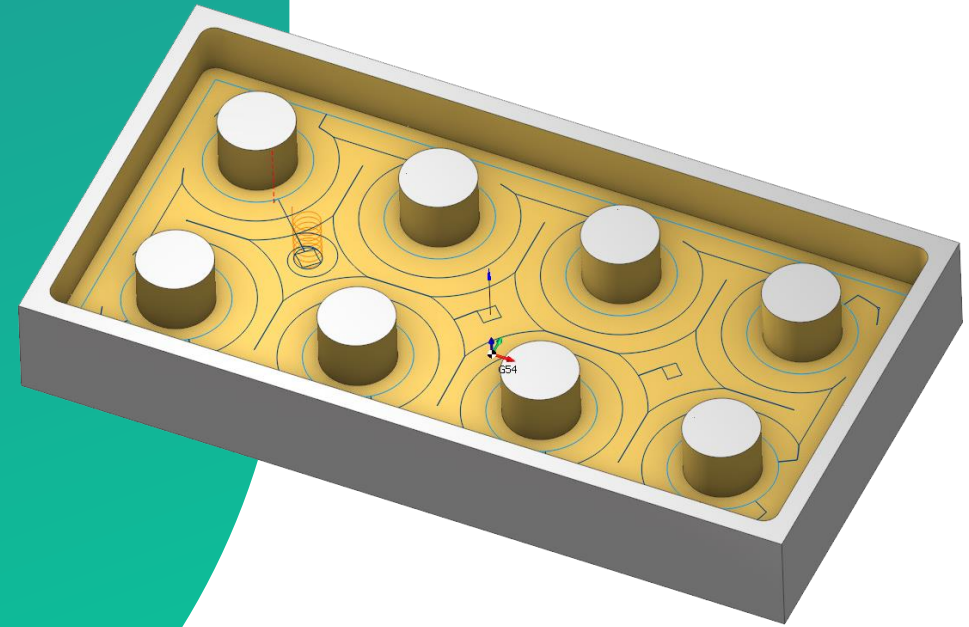
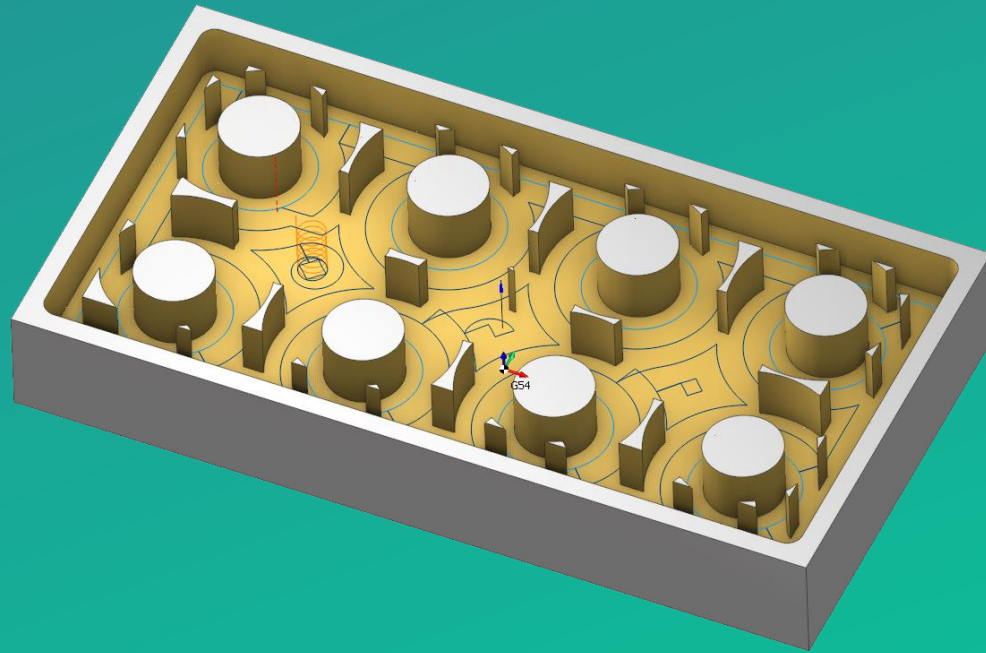


The Top 5 operations commonly utilized by SprutCAM X users on a daily basis

1. 2D contouring
2. Roughing waterline
3. Holes machining
4. Face milling
5. 5D surfacing



Roughing waterline



Roughing waterline

Features

- Seamless integration of rest machining in corners
- Accelerated calculation speed by 30-40% (while using a single core)
- Significantly enhanced stability
- Simulation feature emphasizes cutting during non-cutting feed movements
- Simulation feature highlights forbidden plunges

Benefits

- Enhanced precision through seamless rest machining integration in corners
- Faster calculation speed for increased productivity
- Improved stability for a reliable machining experience
- Prevention of errors and improved safety through simulation highlighting forbidden plunges



Undercut waterline for 3-axis machining



Machining New operation

Links Run Reset

3-axis milling machine
Undercut 1 T#1 Slot mill

Links/Leads

- Approach/Return
 - Approach Short -- From Previous
 - Return Short -- From Previous
 - Tool change position From Previous
- Safe motions
 - Safe level 10 mm from the part
 - Approximate safe motions 10 ° when needed
 - Machine optimized transitions
 - Advanced axes limits control
- Links
 - Short link type Straight
 - Long link type On Safe Surface
 - Entry/Exit link type On Safe Surface
- Leads
 - Feed switch level 100 %Ø (36 mm)
 - Use leads for short links
 - Engage
 - By Horizontal Arc 90 °
 - Radius 49 %Ø (17.64 mm)
 - Retract
 - By Horizontal Arc 90 °
 - Radius 49 %Ø (17.64 mm)
- Distances
 - Short link max distance 100 %Ø (36 mm)
 - Rapid distance 144 mm
 - Air move safety distance 72 mm

Dynamic

Global CS 25%



Undercut waterline for 3-axis machining

Features

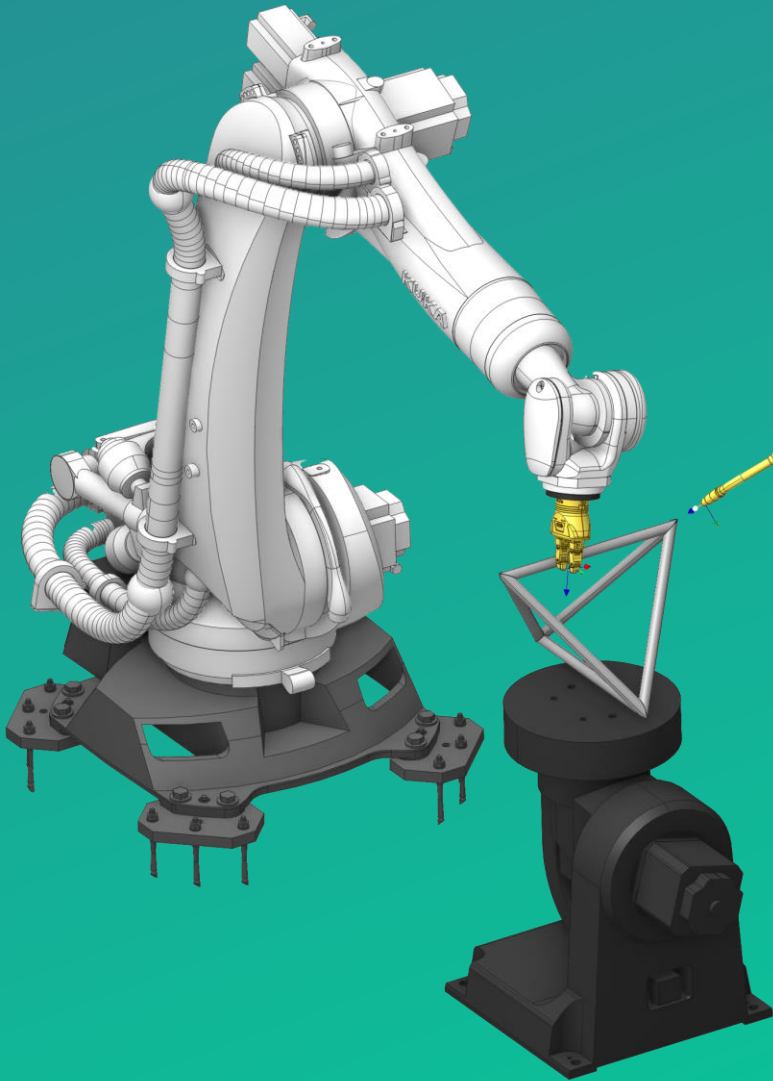
- Any kind of undercut tools (lollipop, disk tool, slot tool)
- Adaptive rough passes
- Multicore calculation

Benefits

- Simple to use (just create and click Run)
- Quick and correct results



Point Pick and Place



Simple example for pick and place

Machining

Links Run Reset Parameters

Model

Machining

Simulation

Job assignment

1. Start

2. Pick

3. Move

4. Move

5. Place

6. End

Properties

Position

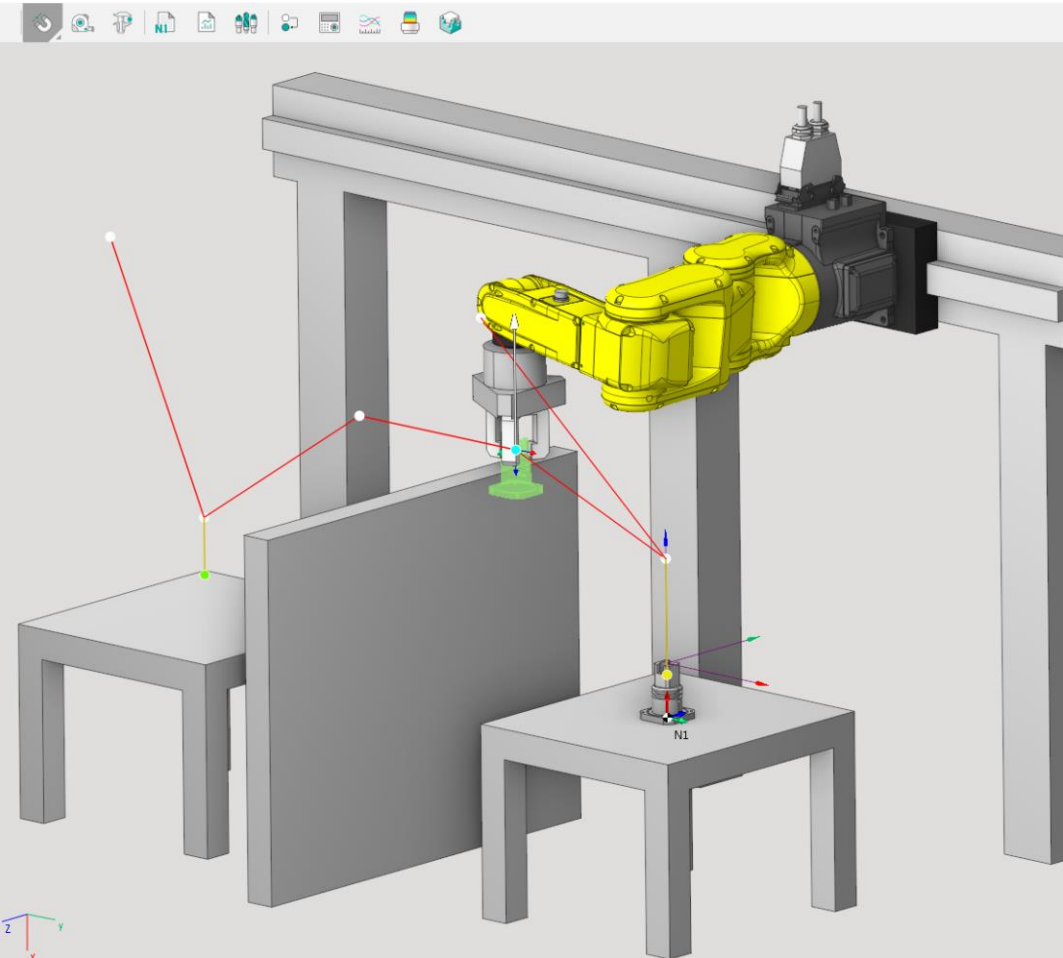
Additional transformation

Fix vX

Motion type

Axes

E2	53	
A1	-93.93	- +
A2	-12.32	Flip 1
A3	-22.67	Flip 3
A4	-89.29	- +
A5	-93.87	Flip 5
A6	-79.62	- +
E1	280	



Point Pick and Place

Features

- Addition of a new operation based on the existing "Pick and Place" operation
- Introduction of a new working task utilizing nodal points
- Ability to set machine movement positions at specified points
- Flexibility to add and remove points to define desired part movement.

Benefits

- Improved precision and control through the utilization of nodal points
- Efficient customization of machine movement for desired part positioning
- Enhanced flexibility to adjust the movement by adding or removing points as needed



Redundant axes optimizer improvements

- Arbitrary machine parameter control using map
- Added display of boundaries of periodic axes
- Singularity avoidance for the 2-axis rotary table of the robot



Arbitrary machine parameter control using map

The screenshot displays the 'Machine setup' interface. The 'Machine state parameters' section is expanded to show 'WDAT_INDEX' settings. The 'Force control with map' checkbox is checked and highlighted with a red box. Below this, the 'Redundant axes optimizer' panel is visible, featuring a 'Collision map' section with various options and a graph showing a green line representing a path or constraint across different axes.

Machine setup

- > System settings
- Machine state parameters
 - WDAT_INDEX
 - Address: WDAT_INDEX
 - Axis Control: Continuous
 - Force control with map**
 - Group: Other

Redundant axes optimizer

Collision map

- Out of reach
- Out of limits
- Singularities
- Collisions
- Check part
- Check workpiece
- Rapid feed
- Joint links

AxisA6 Axis E2 **WDAT** Lean angle Lead angle

Graph showing a green line representing a path or constraint across different axes. The y-axis is labeled with 1mm and 0.9mm.

Arbitrary machine parameter control using map

Features

- Controlled parameter must be described in schema as an additional axis
- Meaning of axis can be any (Voltage, Current, Paint or Material feed, etc.)
- Value of parameter is defined by graph and smoothly integrated into tool path

Benefits

- Possibility to control and simulate any additional parameter



Boundaries of periodic axes



The image displays a software interface for a robotic arm simulation. The main window shows a yellow robotic arm positioned over a grey 3D model of a mechanical part. The interface includes a top menu bar, a left sidebar with 'Machining' and 'Simulation' tabs, and a central workspace. A 'Redundant axes optimizer' window is open, showing a graph of the robot's workspace. The graph plots the boundaries of the robot's reach for six axes (A1 to A6) and includes a legend for 'Rotary axes overturns (possible)'. The graph shows various colored regions representing different axis limits and overturn points. The 'Redundant axes optimizer' window has a 'Setup' panel on the left with options for 'Collision map', 'Rotary axes', and '6th axis'. The main window has a 'Machining' panel with 'Links', 'Run', and 'Reset' buttons. The bottom right corner shows a zoom level of 28% and a coordinate system icon.

Redundant axes optimizer

AxisA6 Lean angle Lead angle

180°

Additional map legend

Rotary axes overturns (possible)

- A1 min — A1 max
- A3 min — A3 max
- A4 min — A4 max
- A6 min — A6 max
- Overture point

Collision map

- Out of reach
- Out of limits
- Singularities
- Collisions
- Rapid feed
- Joint links
- Show map legend

Setup

- Setup a
- Base
- Rotary
- A1 (A)
- A2 (A)
- A3 (A)
- A4 (A)
- A5 (A)
- A6 (A)
- 6th axis
- Vecto
- Tang

Resolution: 360

View scale: 8

Step (mm): 20

Spline mode

Configuration

Verification: Ok

Number of NC Blocks: 163

Build map

Build graph

Safe distance X mm 70 Y % 2

Update toolpath

Dynamic

28%



Boundaries of periodic axes

Features


- Usage of the full range of 4th, 6th and other robot axes
- Possibility to avoid the positioner singularities
- Warning about axis overturn

Benefits

- Correct toolpath on the first try



Approach/return for the TCPM enabled operations using Local CS

✓  Hole machining 1

- PPFUN: 58, 250, ...
- > Header
- ✓ Approach

RAPID: 10000

PhysicGOTO: Z-100

PhysicGOTO: Y-352, X-580

MultiGOTO: C0, B0

ORIGIN: LCS On - MCS(X95, Y-2, Z10.003, A0, B0, C0), WCS(X95, Y-2, ...

MultiGOTO: Y0, X0

MultiGOTO: Z0

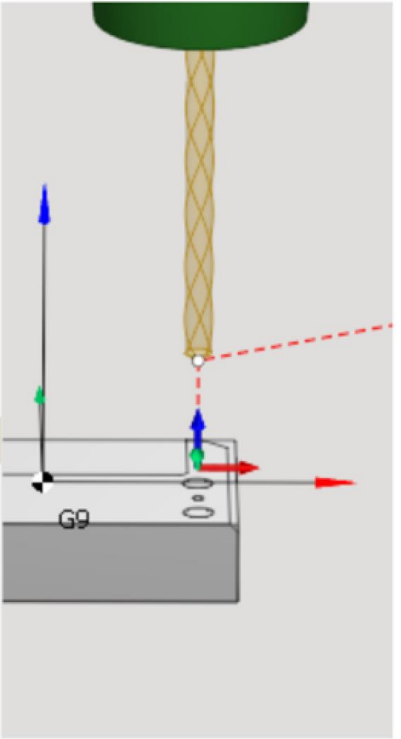
ORIGIN: LCS Off - MCS(X-675, Y-350, Z300, A0, B0, C0), WCS(X0, Y0, ...

INTERP 5Axis On

MultiGOTO: Y-2, Z10.003, X95

MultiGOTO: Y-2, Z10.003, C0, B0, X95

> Hole1



Approach/return for the TCPM enabled operations using Local CS

Features

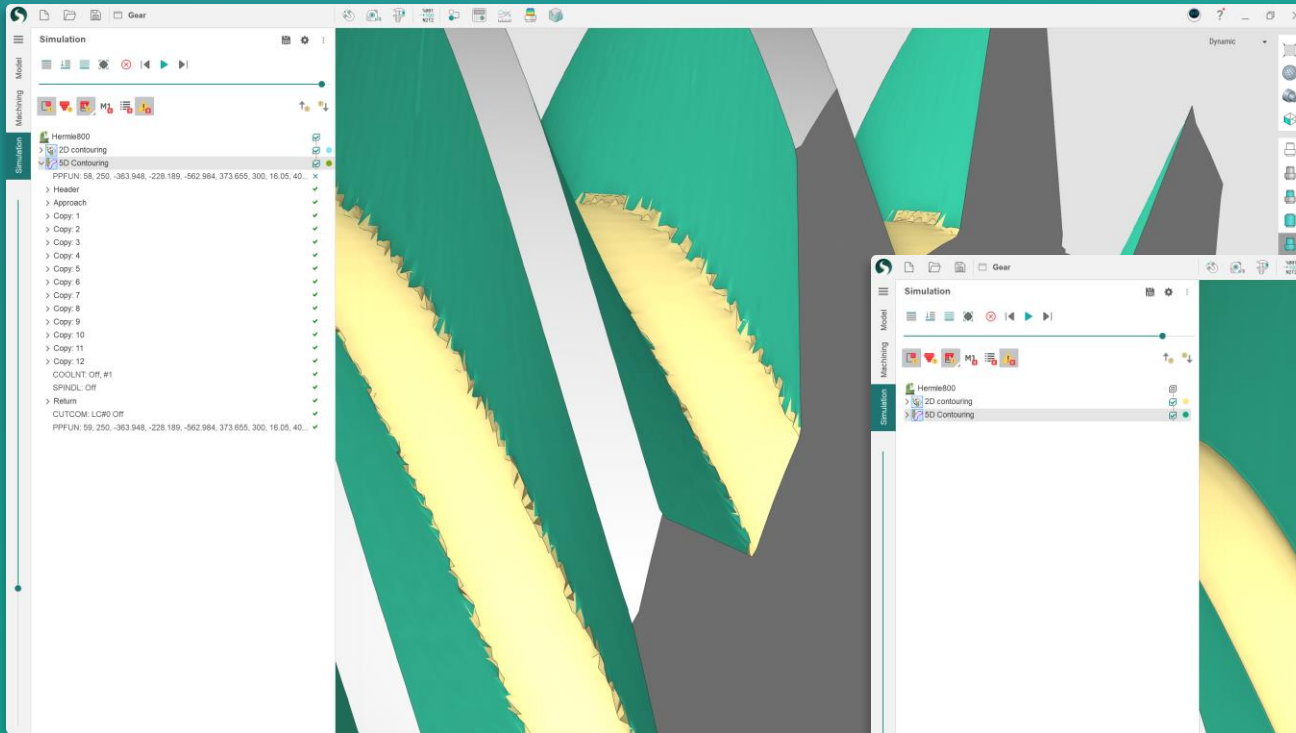
- 5-axis tool center point management (TCPM) functionality
- Temporary activation of a specific LCS (Local Coordinate System) for tool movements
- Example command showcasing the usage of SLCS (Switch LCS) feature

Benefits

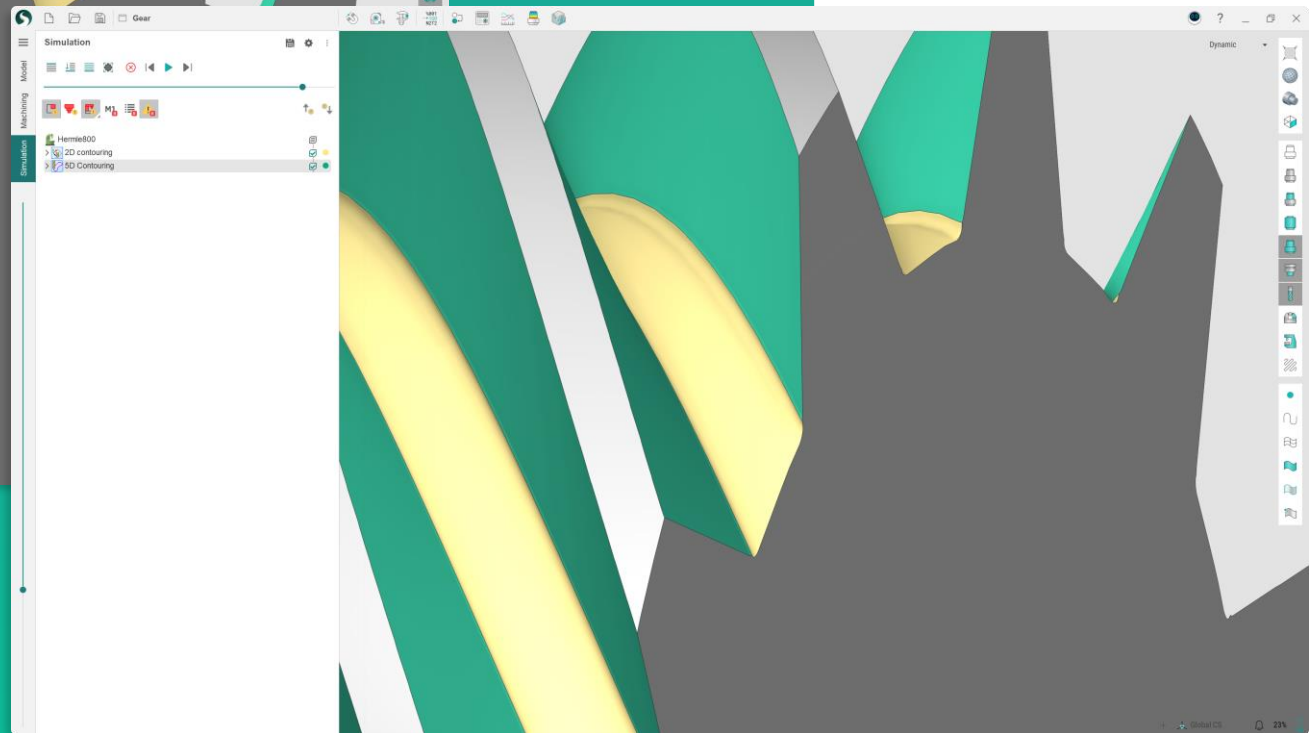
- Enhanced safety with adaptable tool movements using specific LCS activation
- Versatile support for different machine kinematics, expanding application possibilities
- Precise control over the tool's center point management for accurate machining
- Efficient execution of tool movements within the appropriate LCS, optimizing machining processes



5-axis Solid Simulation



Solid



Voxel



5-axis Solid Simulation

Features

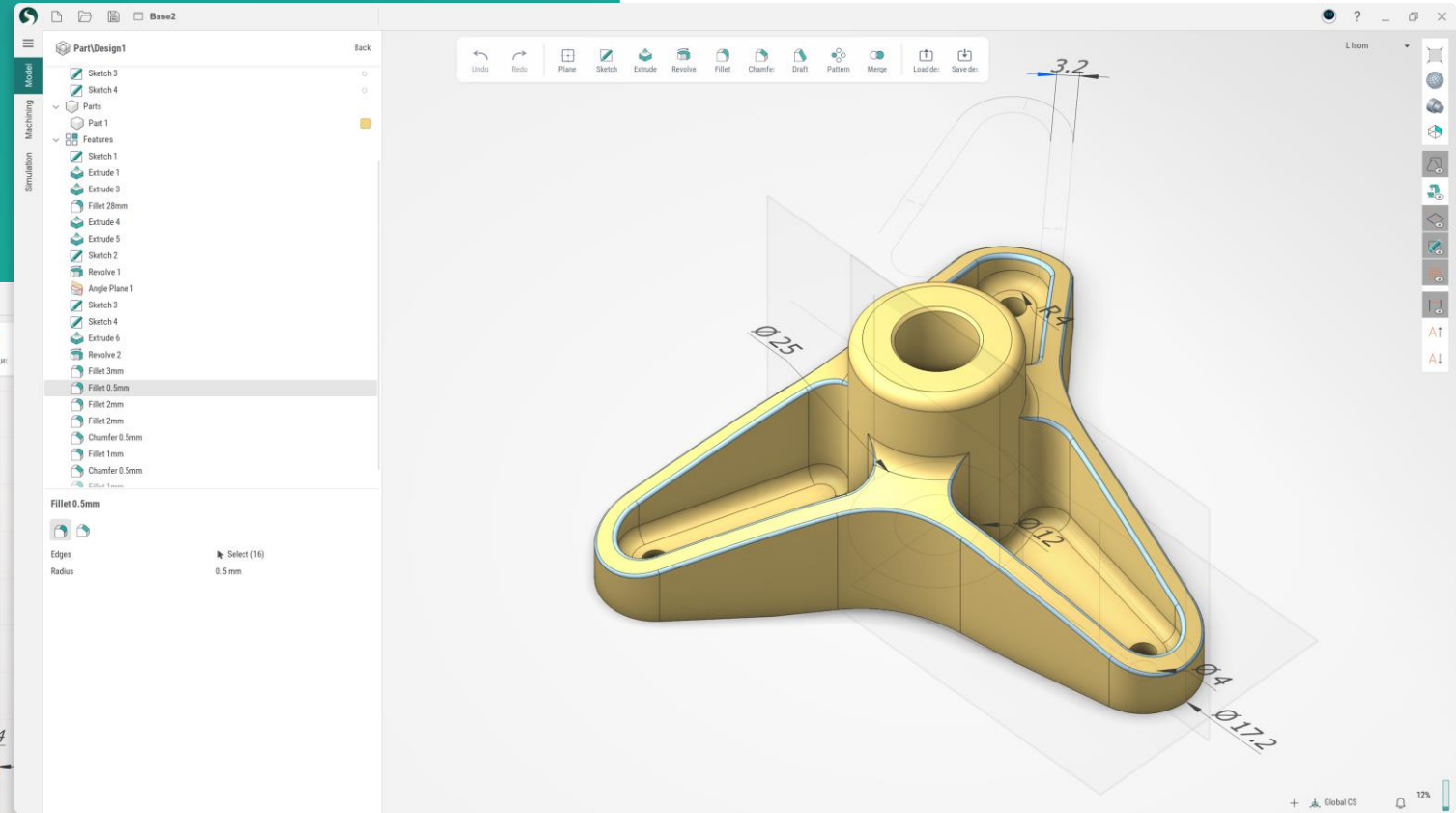
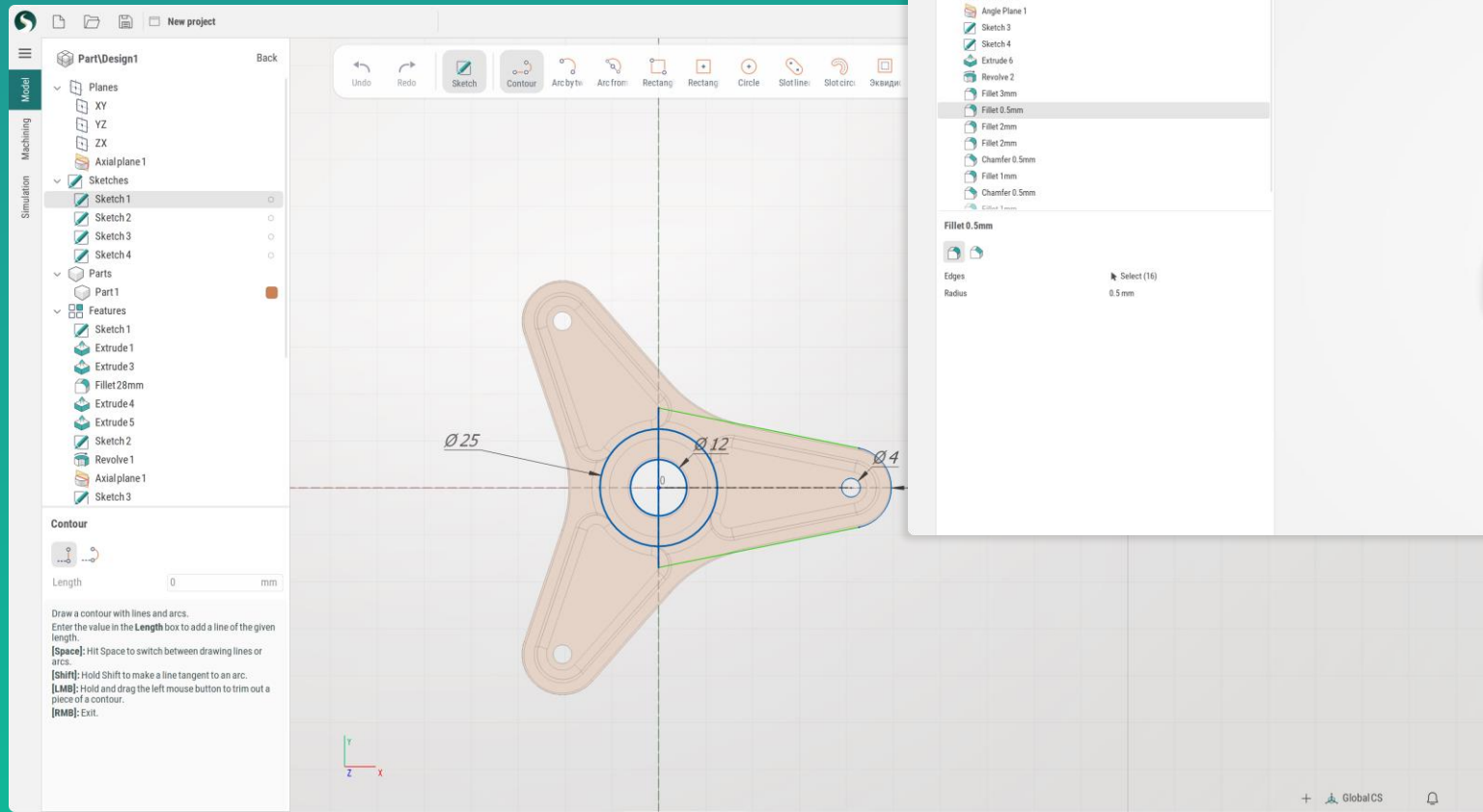
- Facet triangles solid representation
- Ultra-high solid tolerance (up to 0.0001)
- High optimized algorithms

Benefits

- Unique technology
- Unsurpassed quality
- Fast calculation time

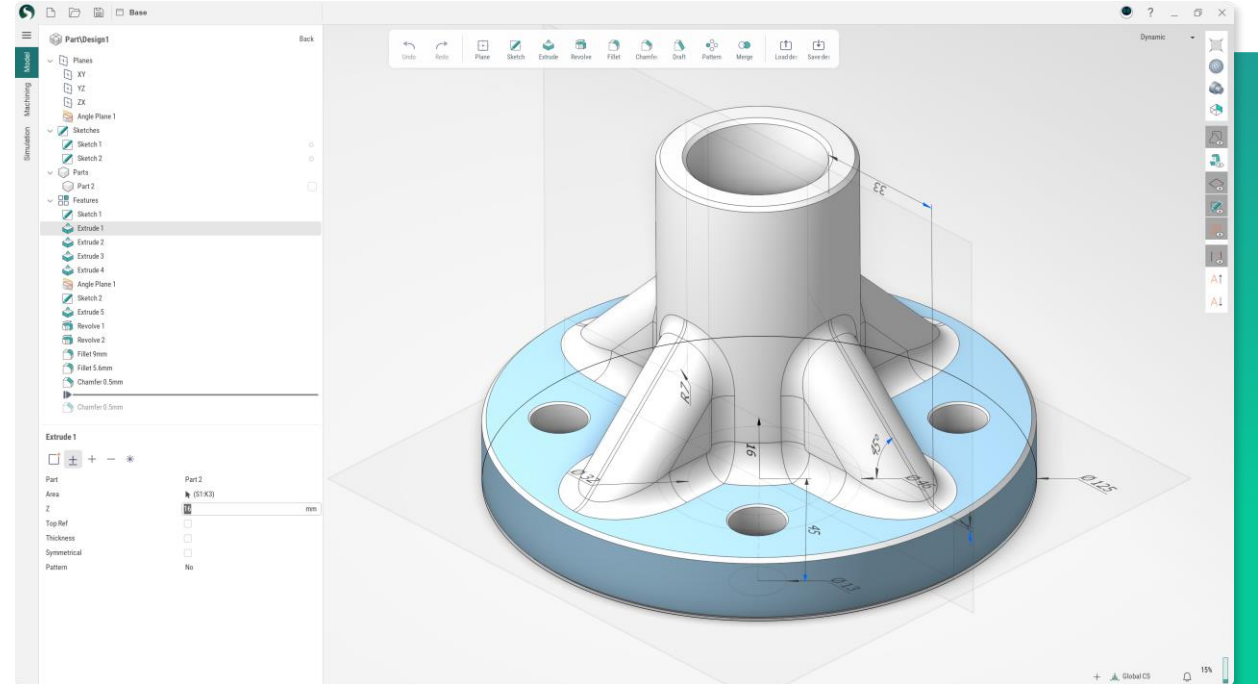


CAD



UX/UI

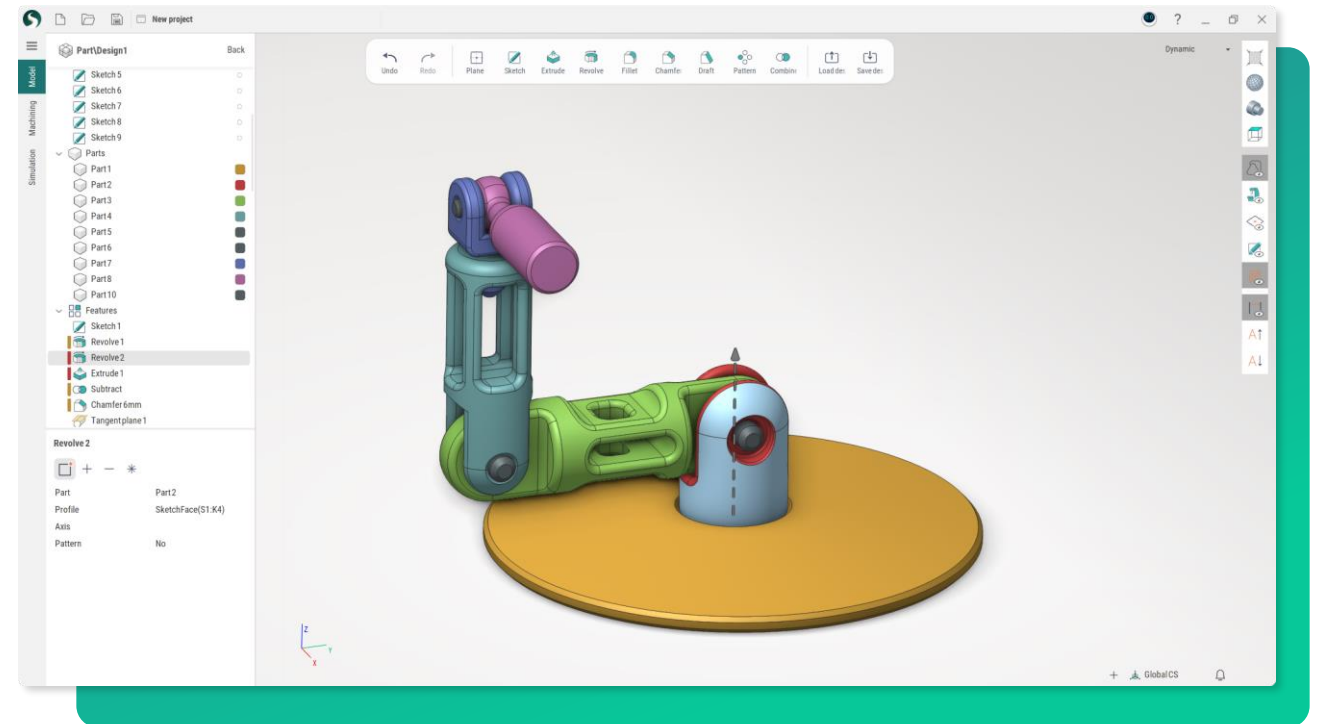
- UI Enhancement
- Redesign with support for HD monitors
- Streamlined workflow for new users: tool panels, tooltips
- Full-fledged model construction history: rollback position, operation reordering, operation editing
- Increased diagnostic information for users
- Improvements for multi-part modeling



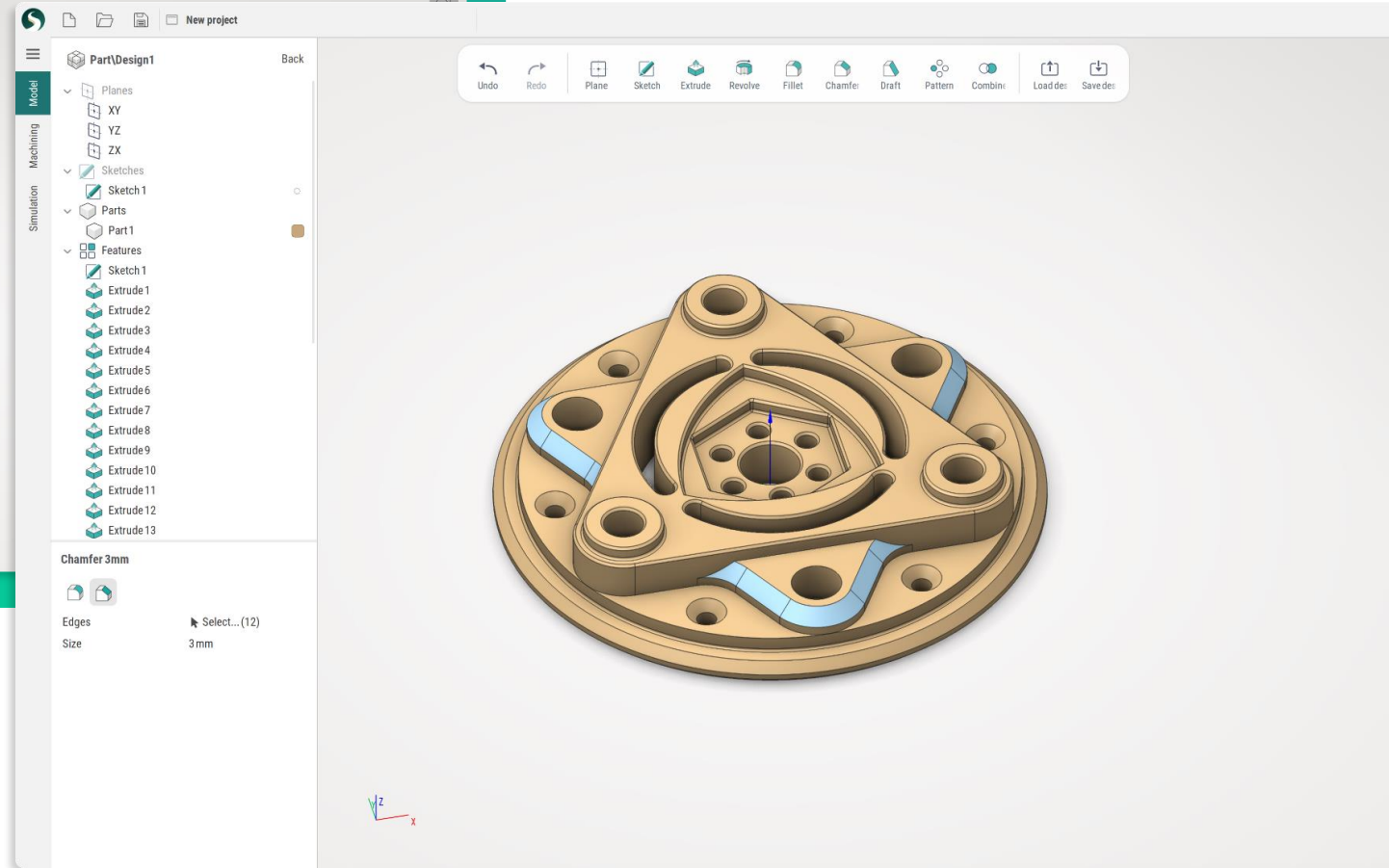
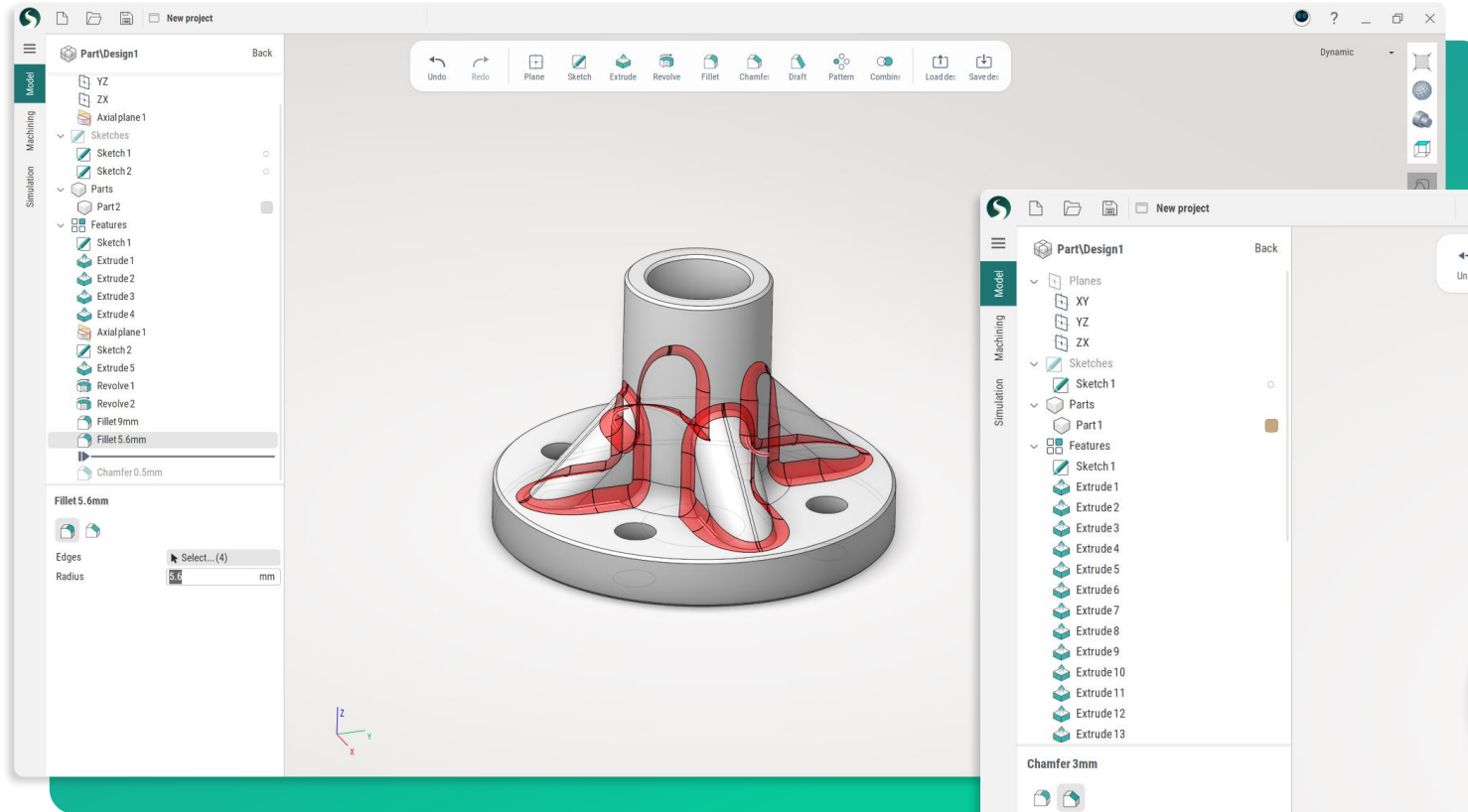
Performance and stability



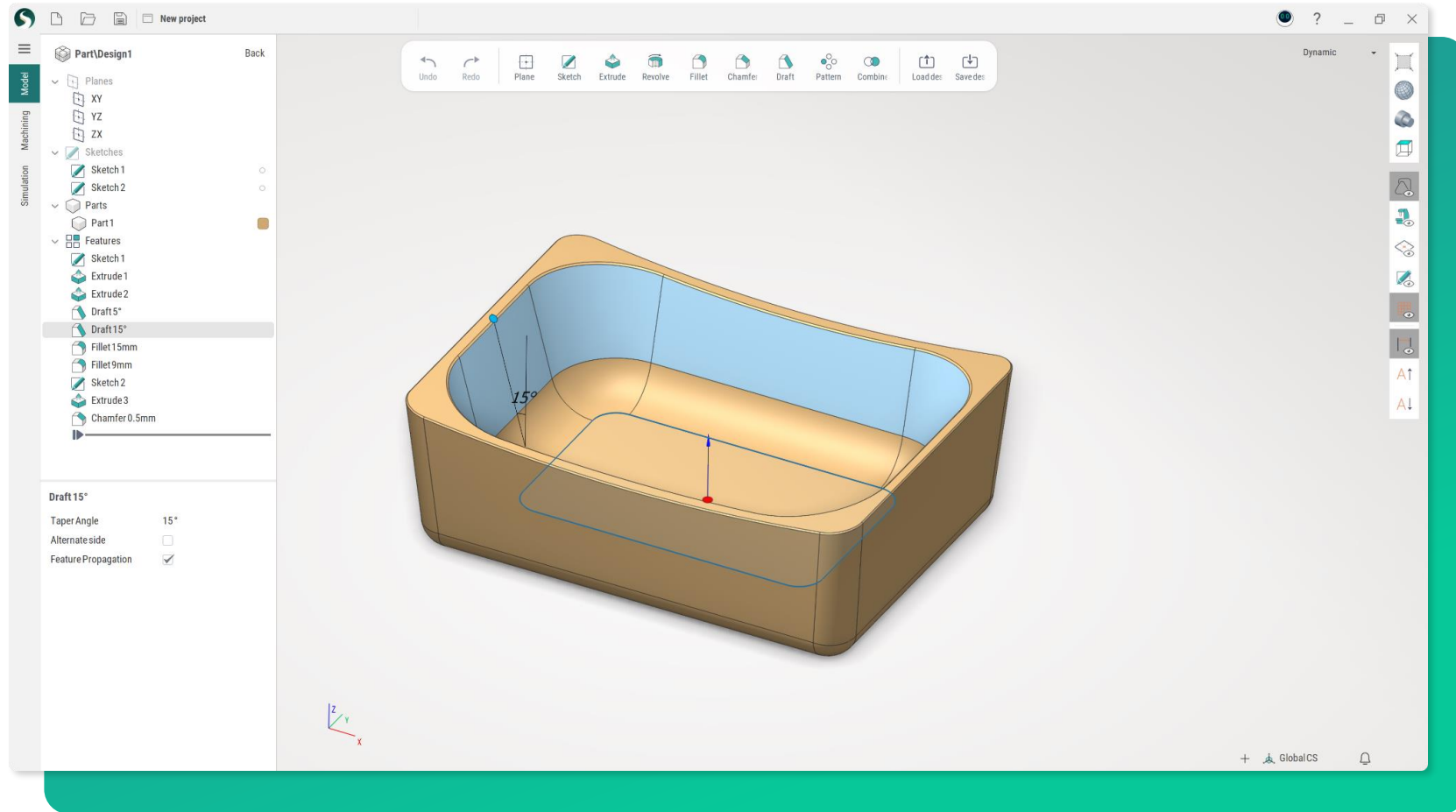
- Incremental 3D model updates
- Improved stability



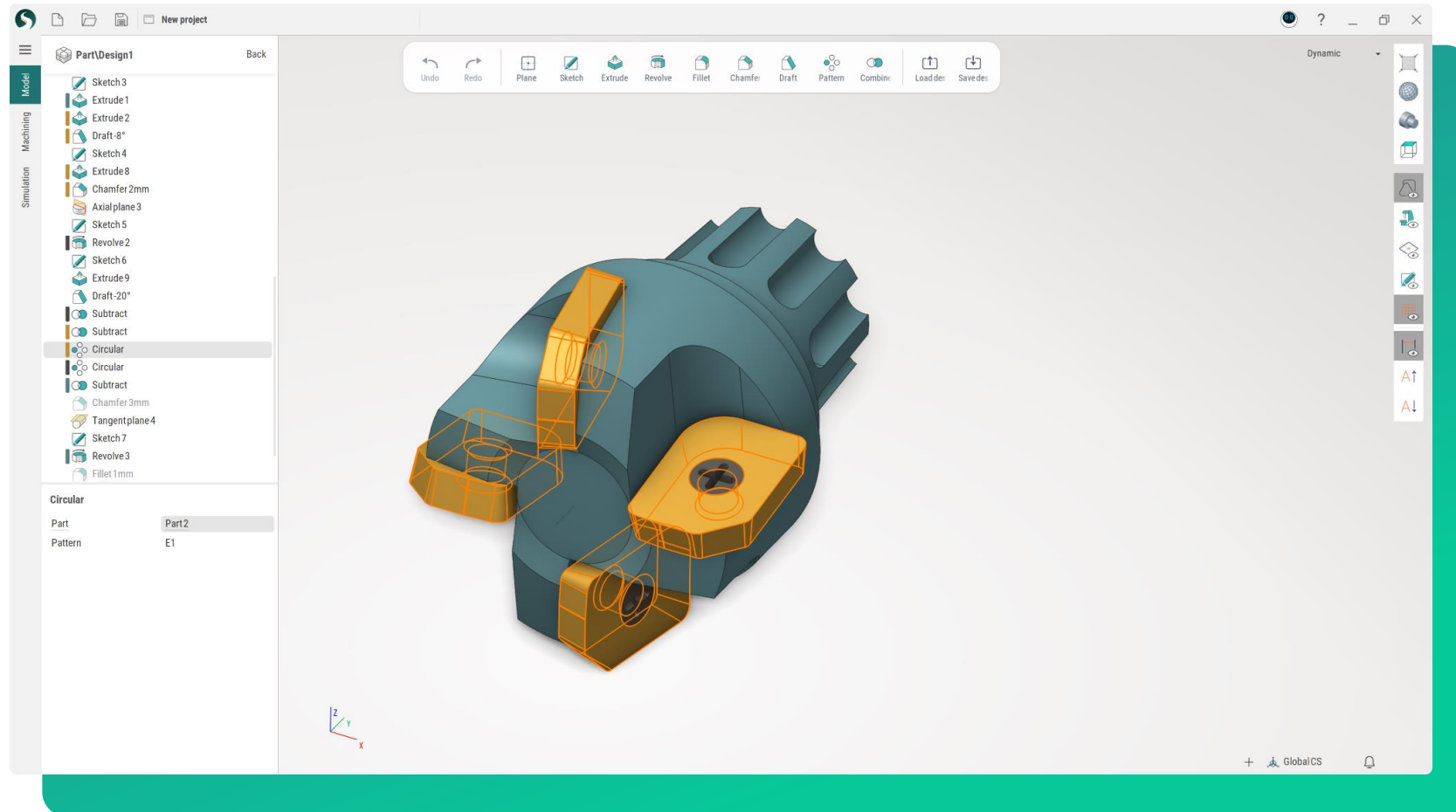
Fillets and chamfers



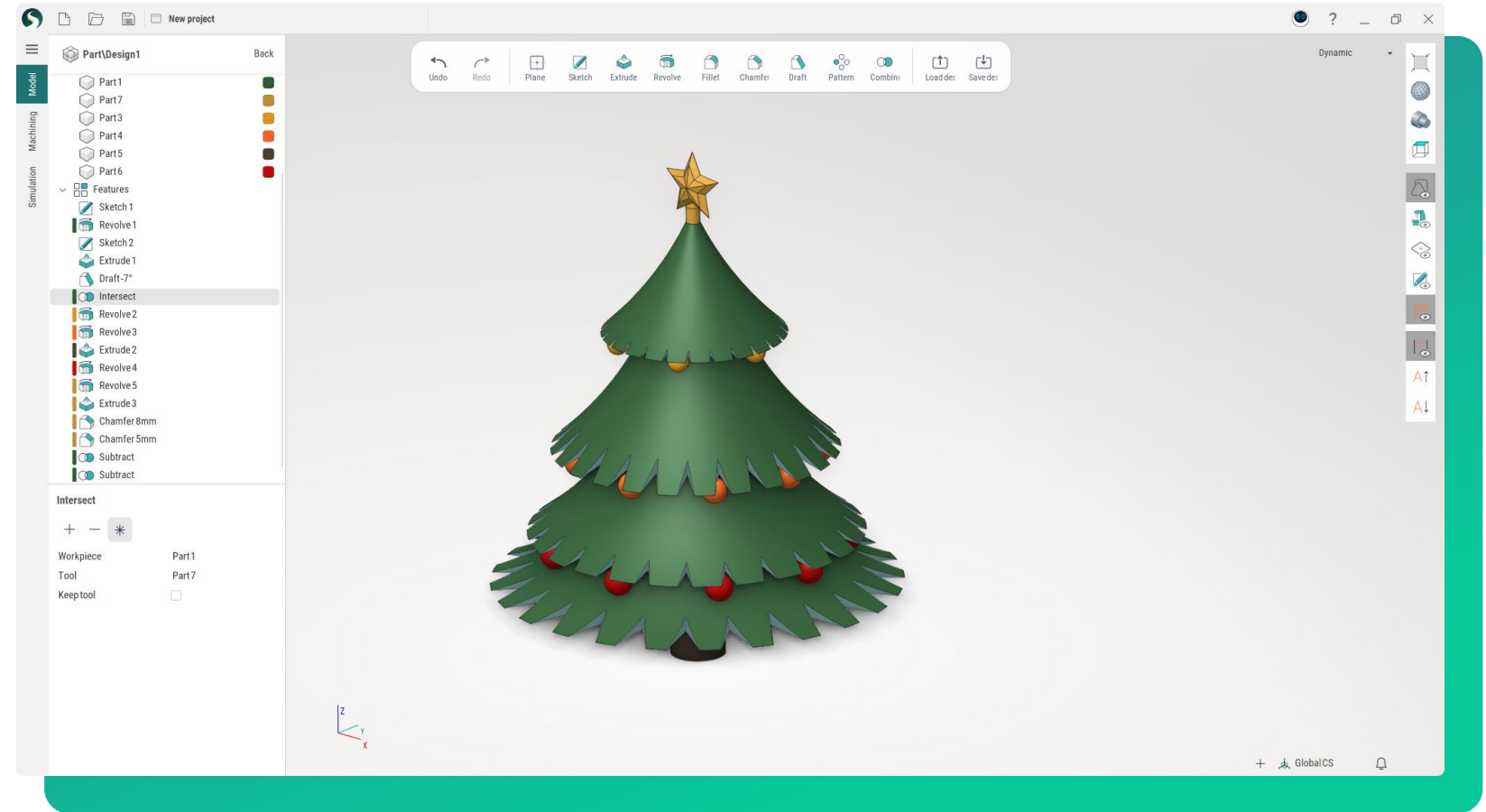
Draft



Pattern



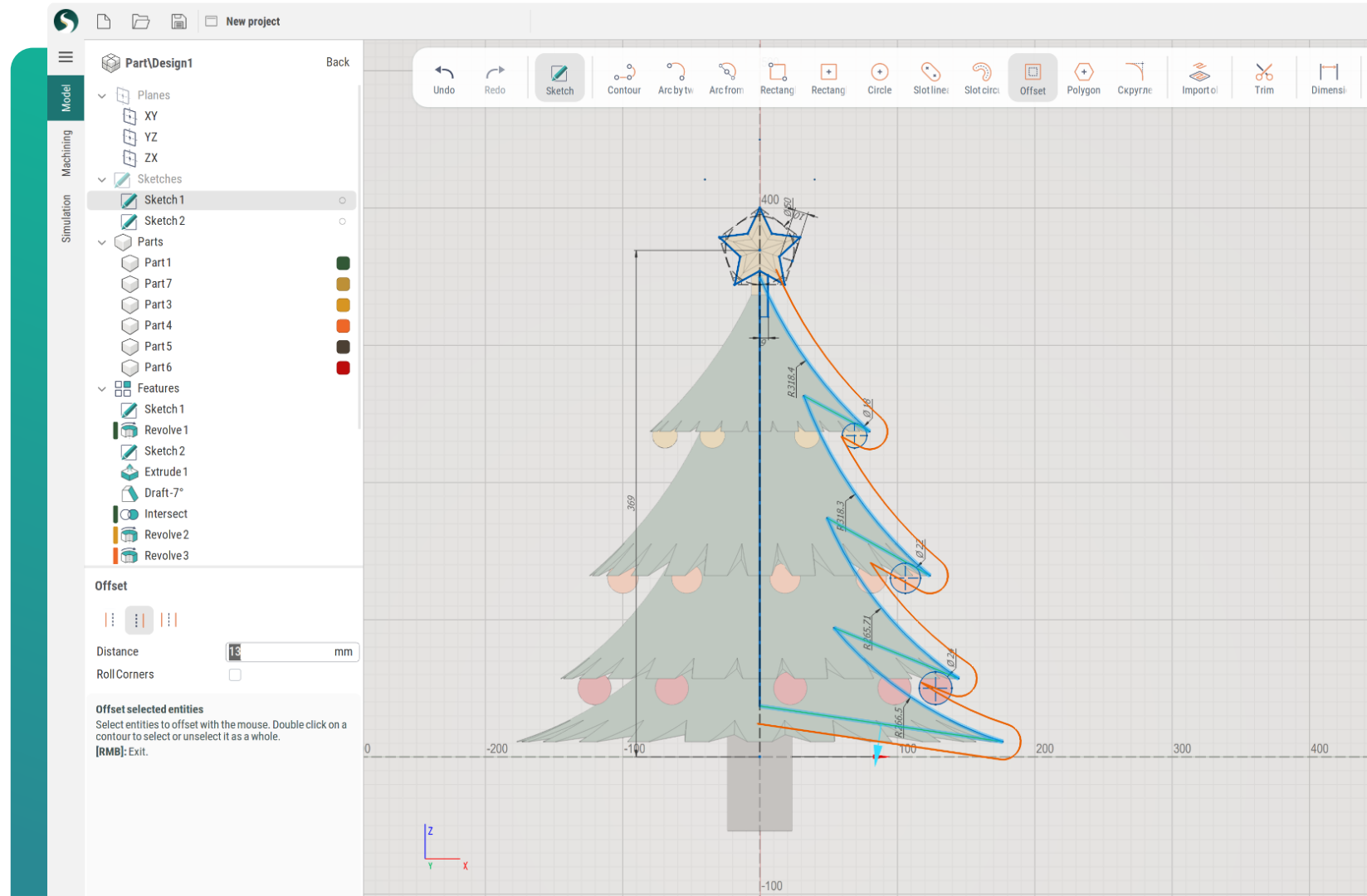
Combining parts using boolean operations



New sketching features



- The offset command has been separated as a standalone function
- The "Image to Trace" command has been separated as a standalone function
- Tooltips have been added for all sketching tools



Introducing SprutCAM X 17,
our most powerful and
functional version yet!





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