RobotStudio
Machining PowerPac
Increased engineering efficiency

ABB

RobotStudio Machining PowerPac

- Introduction
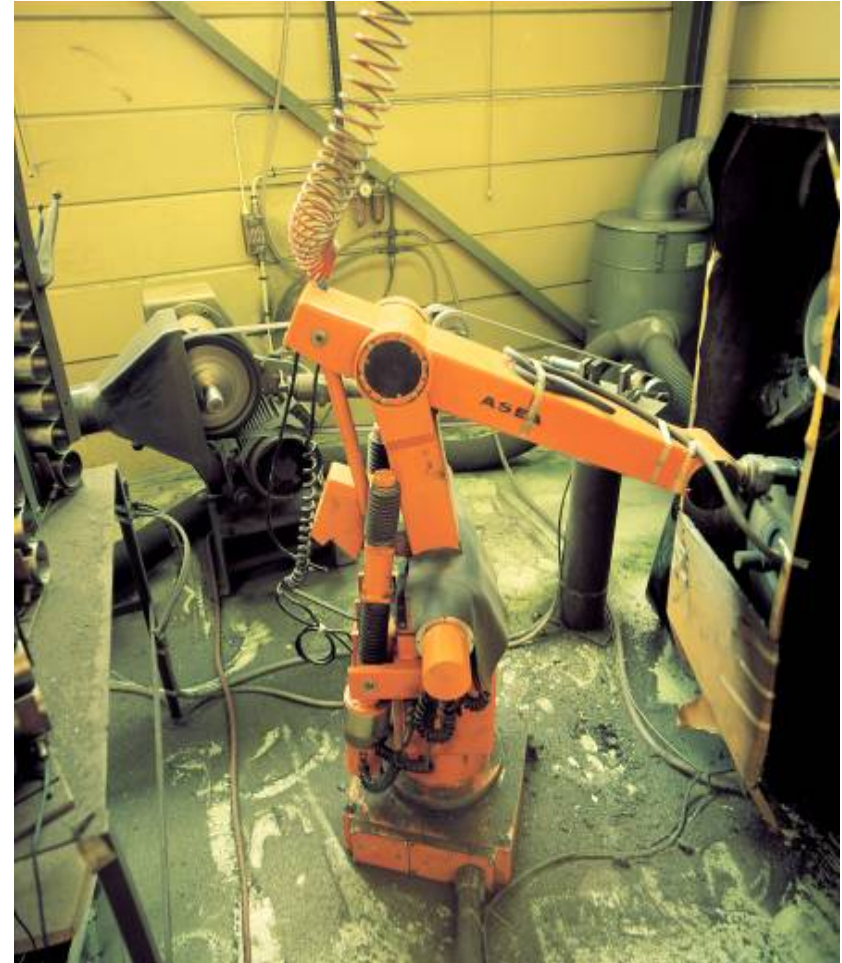
- Features

- Benefits

- Requirements

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33 years of robotized machining

"The world's first electrical robot sold in 1974 was for grinding and polishing of stainless steel tubes."

ABB was an innovator and has become #1 in robotized finishing

We intend to stay as the leader

IRB 6 sold by ABB in 1974 to Magnusson in Genarp, Sweden

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Why is machining not fully robotized?

- Programming time has been far too long to permit frequent product changeovers

    - Only large batch sizes have been feasible

- Difficult application with many parameters affecting the process result

- Industry tradition to use other machining methods

- Robot arms have not been suitable for all applications
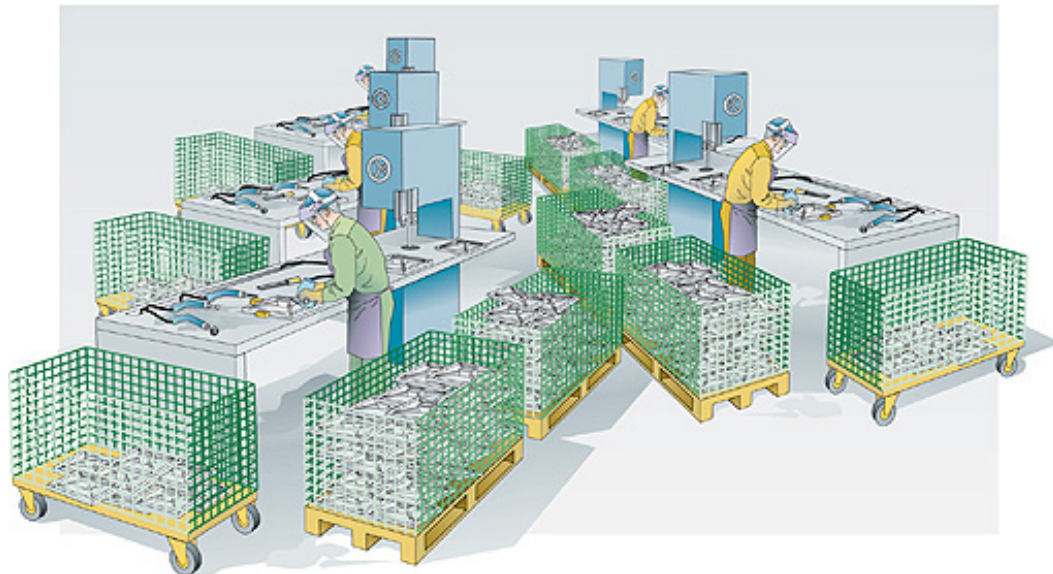
DEFINITION
Machining includes:
Grinding
Deburring
Polishing & Linishing
Buffing
Milling
Sawing
Deflashing
Sanding
Etc.

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Industry with changing values and demands

- End of an era - **Manual Machining**

  - Inconsistent part quality, high scrap and reclaim rates

  - Hazardous, dirty work environment

  - High injury rate and long-term health problems

  - Low availability

  - Difficult to recruit personnel

  - Low status

 - Labor intensive and expensive operation

- Beginning of an era - **Robot Machining**

  - Consistent high product quality

  - Reduced tooling costs

  - High availability

  - Safe environment with less injuries

  - Safe environment

  - Attractive & rewarding workplace

  - Positive, high-tech image

  - Improved recruitment possibilities

  - Long-term profitability

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Challenges for robotized machining
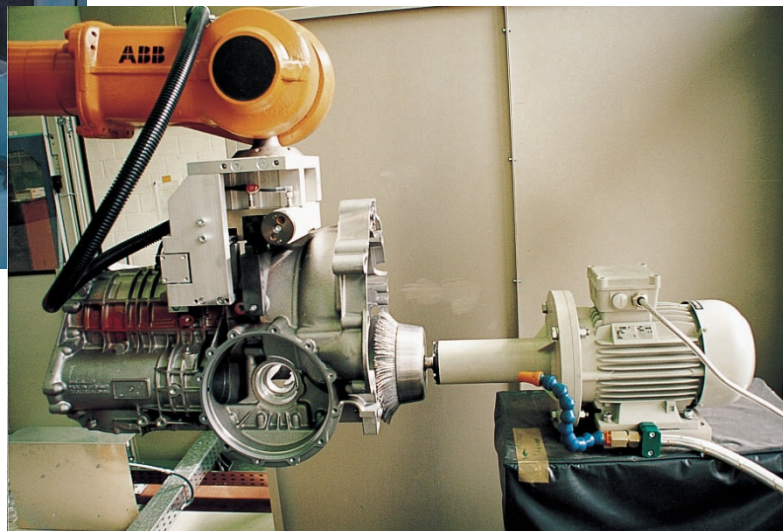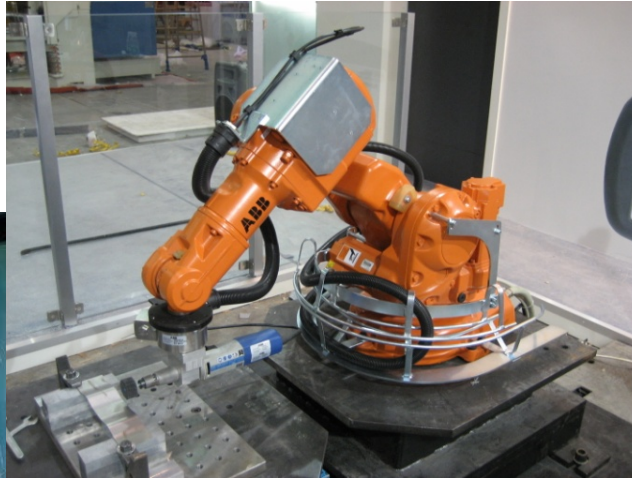
- Short production batches
  - Quick change over time is required
- Traditional programming is time consuming
- Many parameters affecting the process result
- Accuracy requirements in the process

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RobotStudio Machining PowerPac

- Software for off-line programming of machining applications

- Contains functionality for

  - Automatic path generation on surfaces or edges

  - Path and target optimization

  - CAD import and processing

  - Experience sharing

  - Work object calibration

  - Force controlled machining
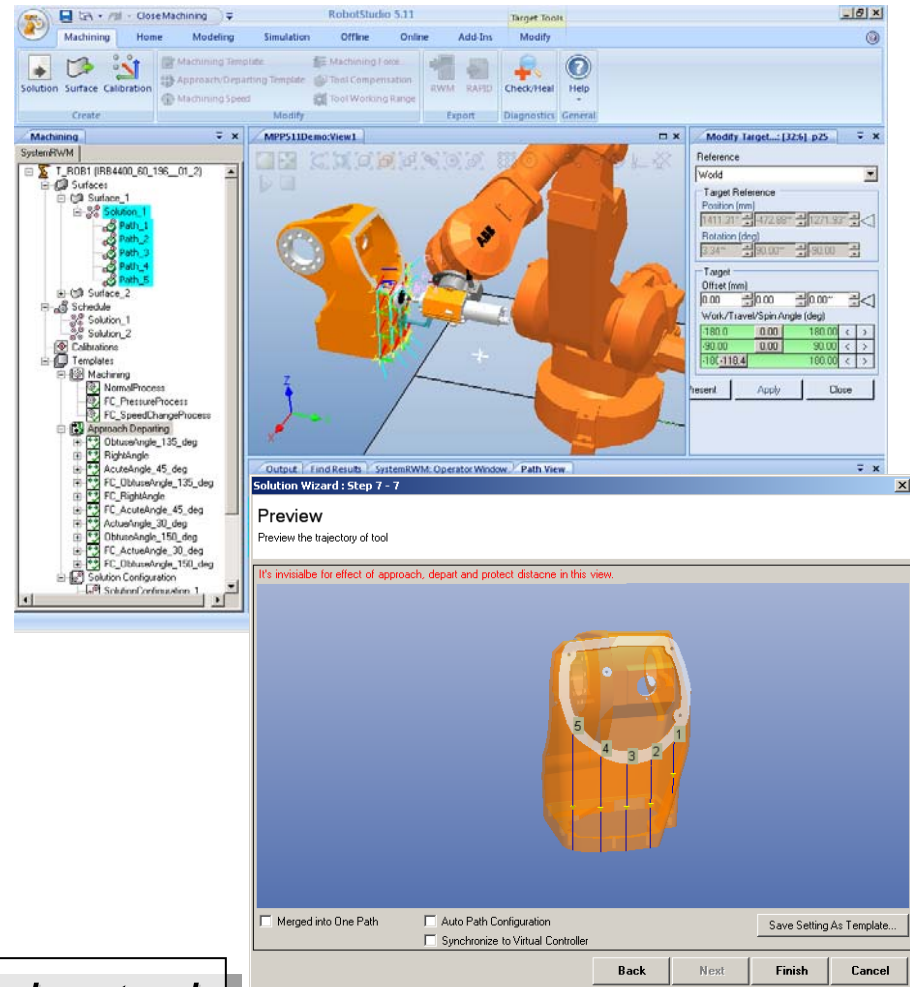
A superior offline programming tool for machining applications!

RobotStudio Machining PowerPac

- **Reduce programming time**

  - Create thousands of robot targets in seconds

  - Path and target optimization

  - Create program from CAD model

- **Control of process parameters**

  - Robot speed and arm configuration

  - Tool compensation and tool machining angles

  - Force control settings

- **High accuracy of created path in relation to CAD model**
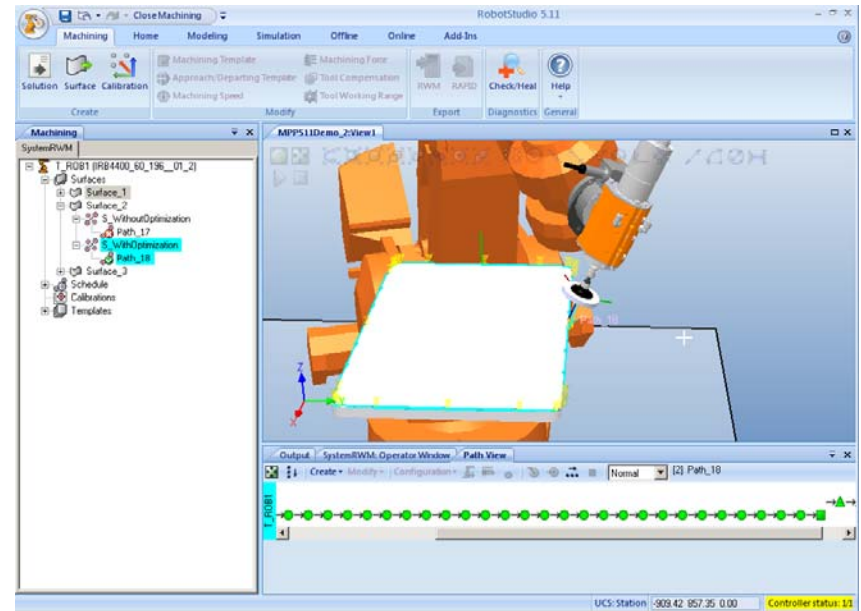
RobotStudio Machining PowerPac

- Introduction

- Features

- Benefits
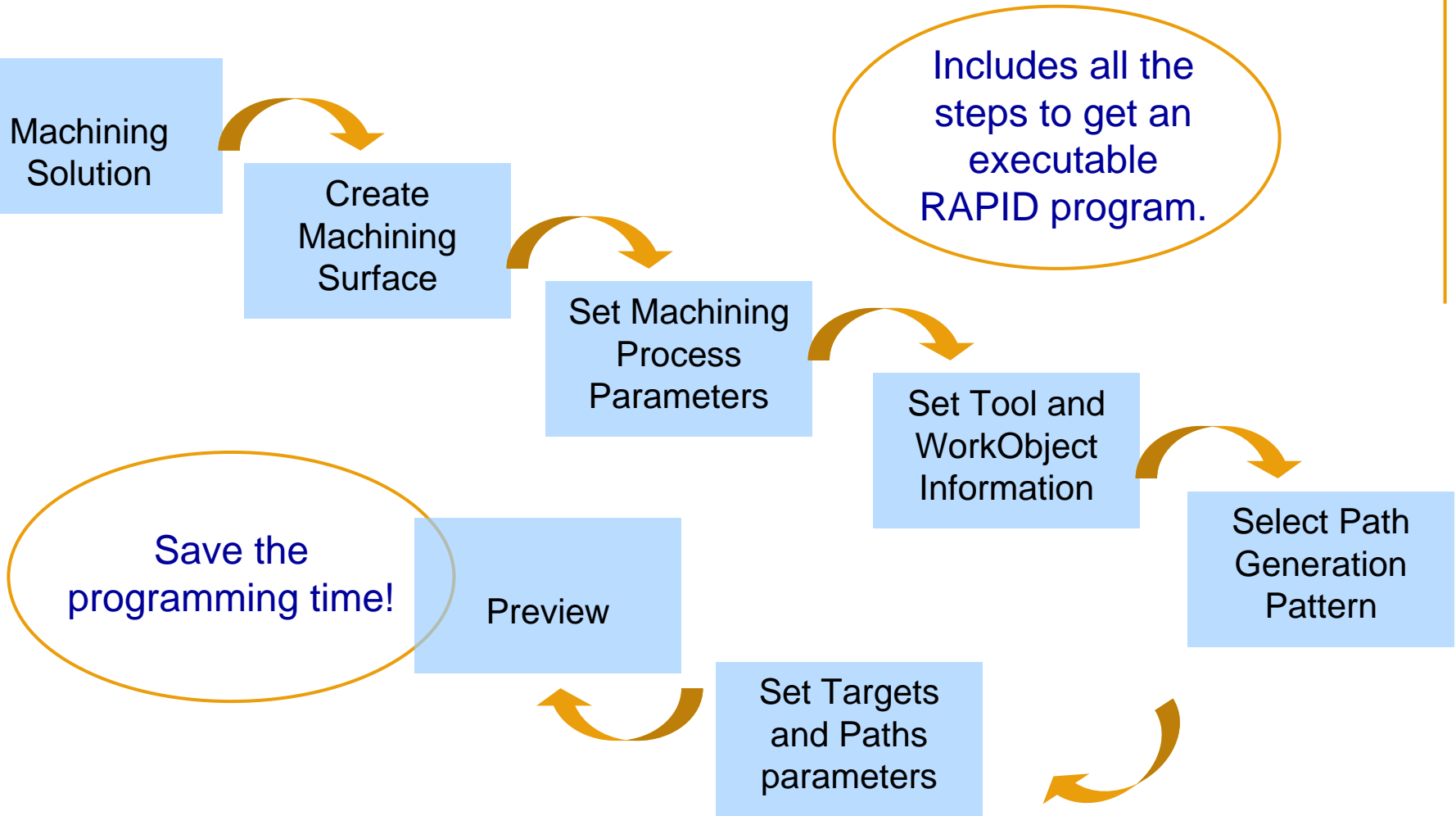
- Requirements

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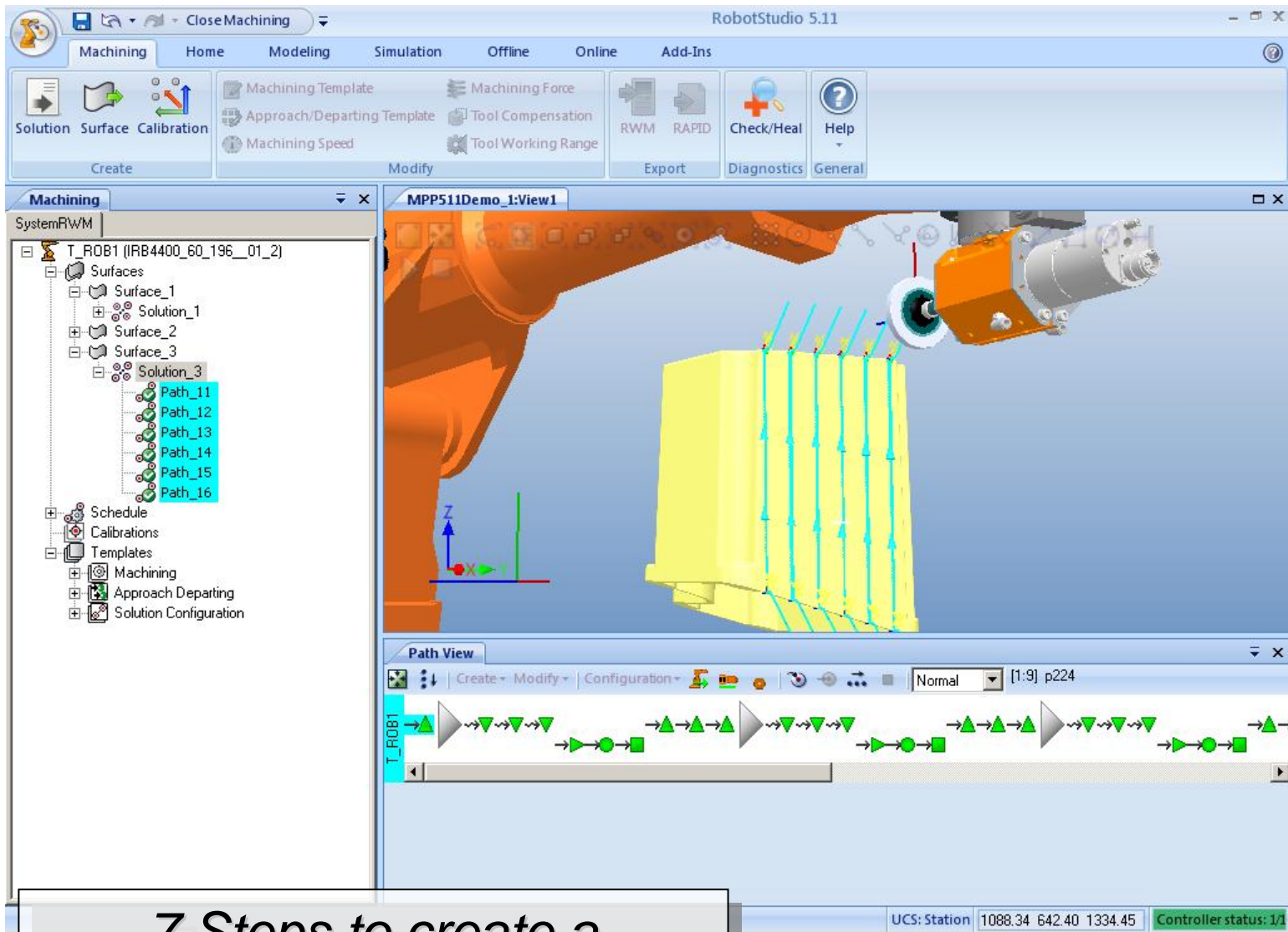# Supported Features

- Path programming wizard

  - Create/select surface or edge to be machined

  - Set machining process parameters

  - Pre-defined path generation patterns

  - Set path and target parameters

- Path and target optimization

- Path and target modification

- Path simulation

- Program export as RAPID or RW Machining FC

- Calibration

- Pre-defined and configurable machining templates

- Check/heal CAD models

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Programming wizard

Machining Solution

Create Machining Surface

Set Machining Process Parameters

Includes all the steps to get an executable RAPID program.

Set Tool and WorkObject Information

Select Path Generation Pattern

Set Targets and Paths parameters

Preview
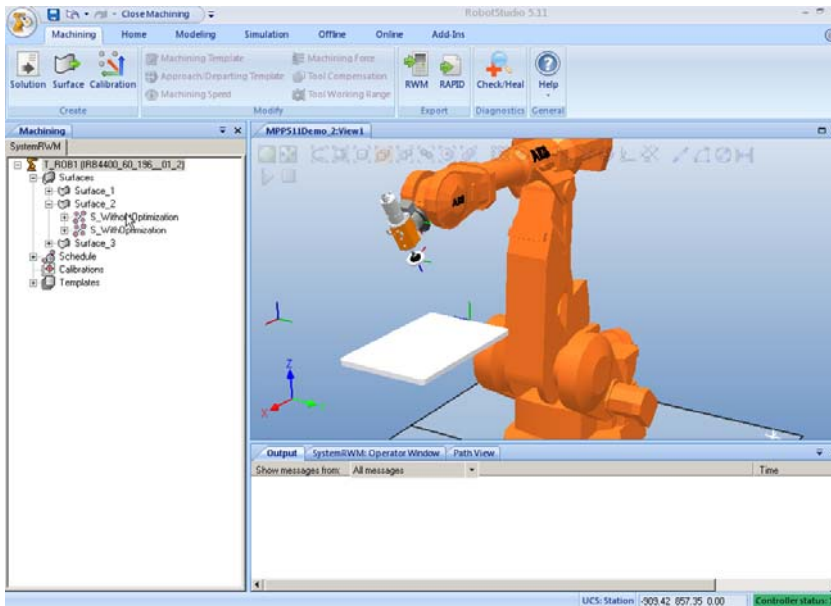
Save the programming time!

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Programming wizard

7 Steps to create a machining program!

Target and Path optimization

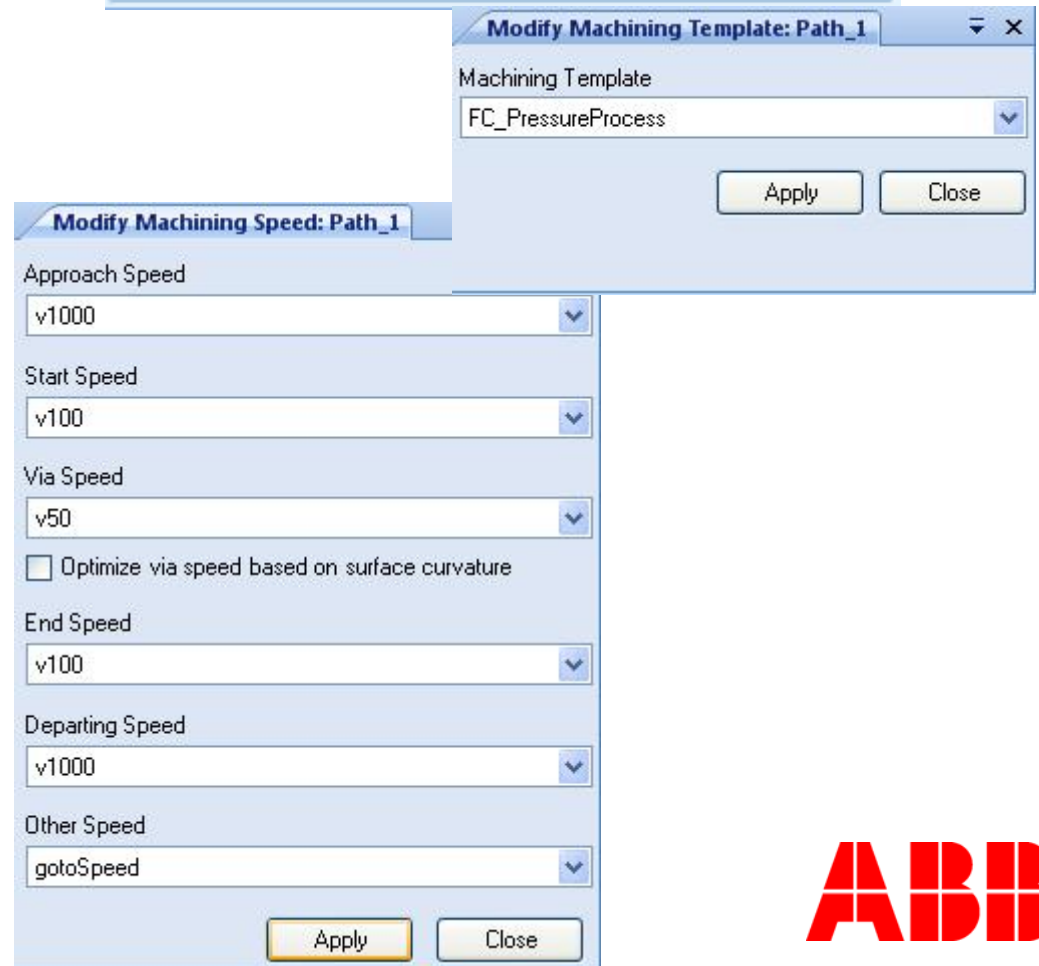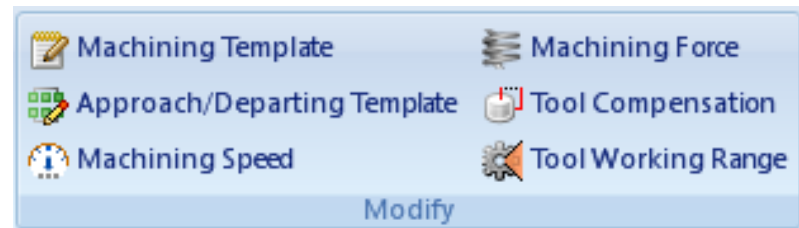Without Target Orientation Optimization

With Target Orientation Optimization
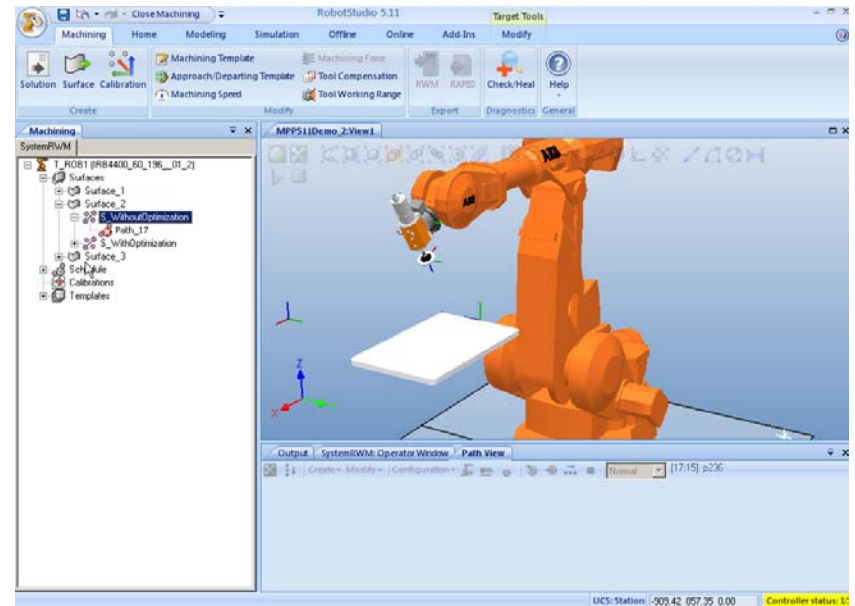
- Greatly reduce the rotation of robot itself
- Improve the reachability of robot target
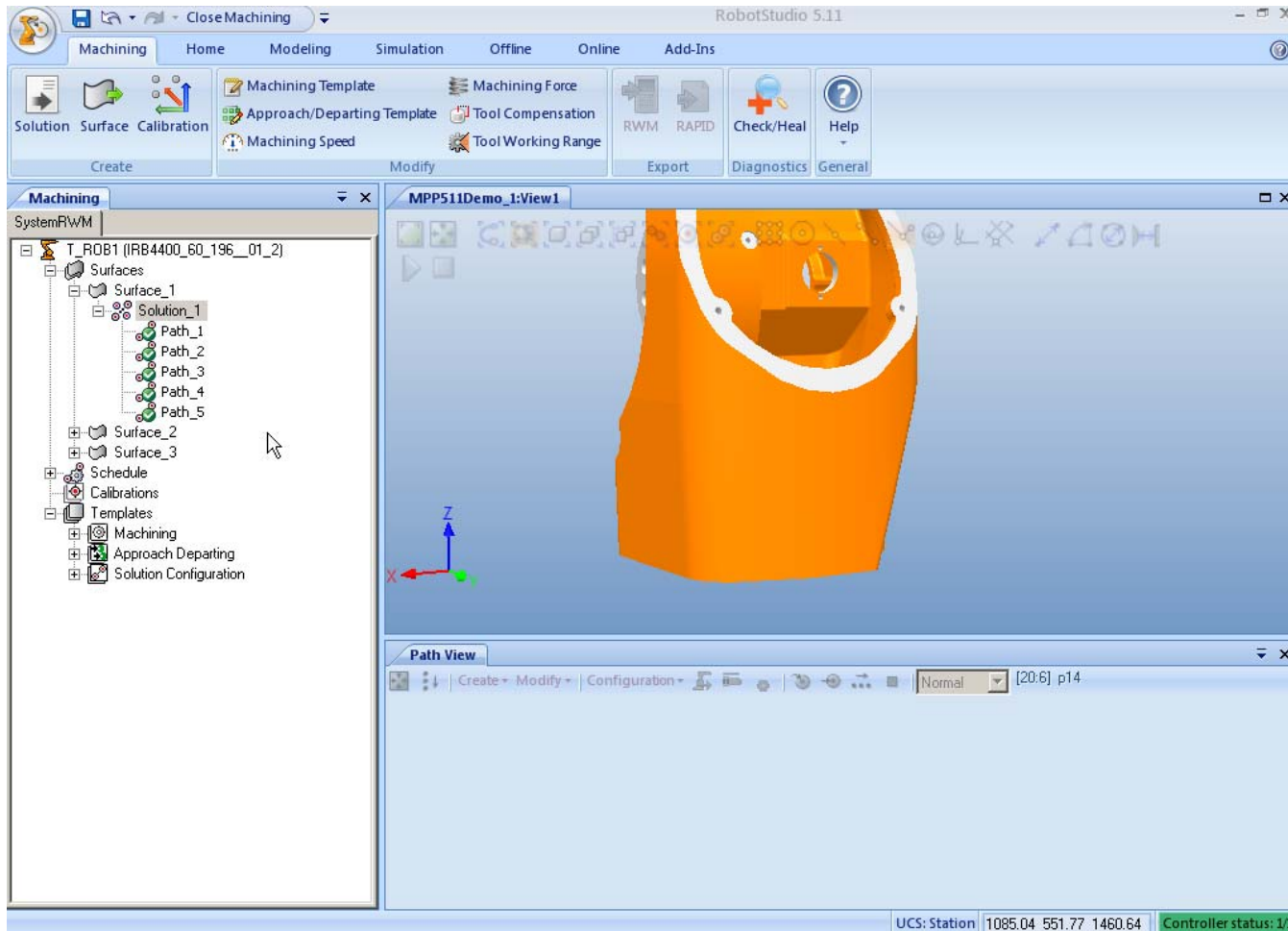
Play movie to show difference!

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Path modification

- Machining Template
- Approach/Departing Template
- Machining Speed
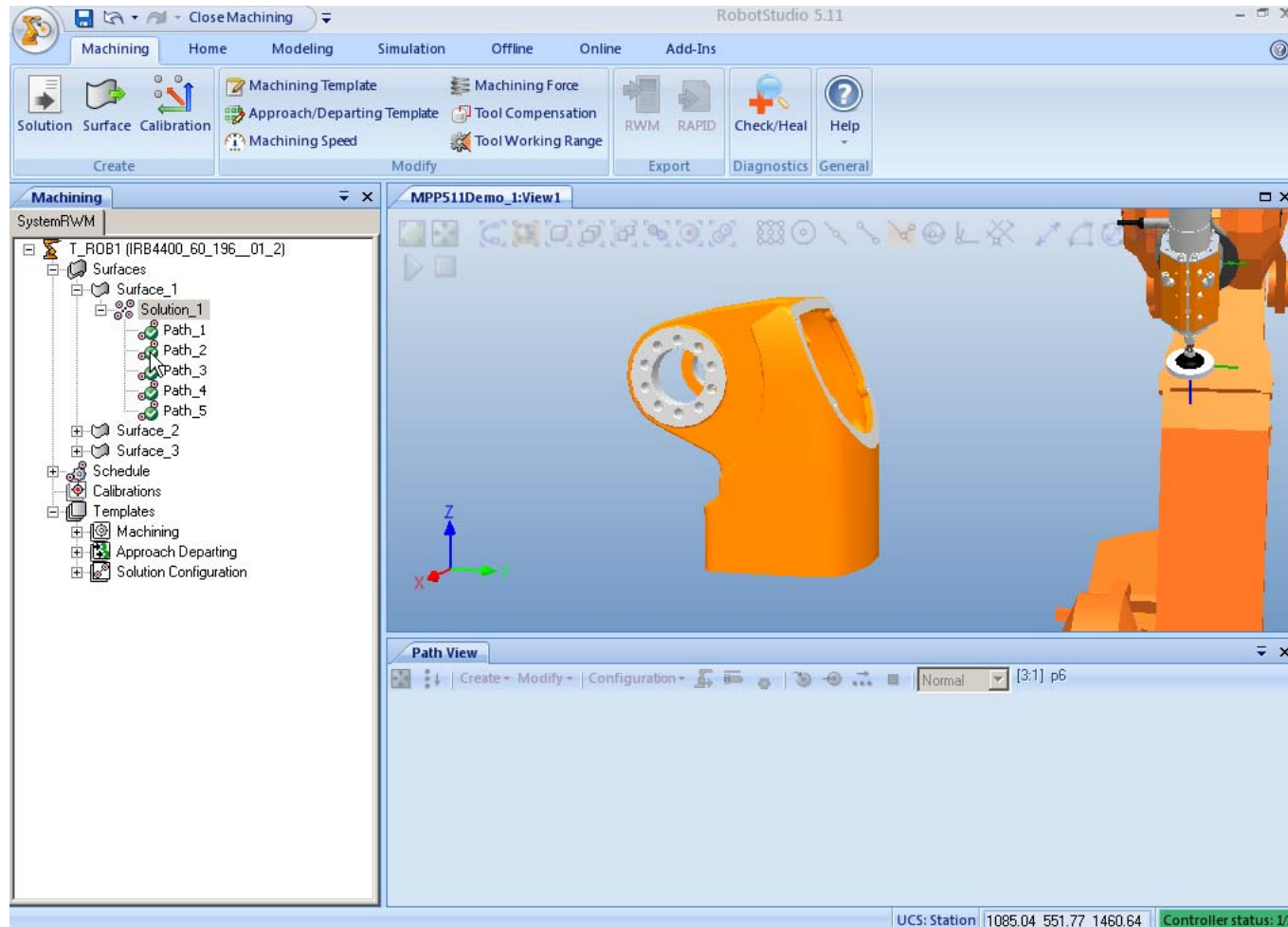- Machining Force
- Tool Compensation
- Tool Working Range
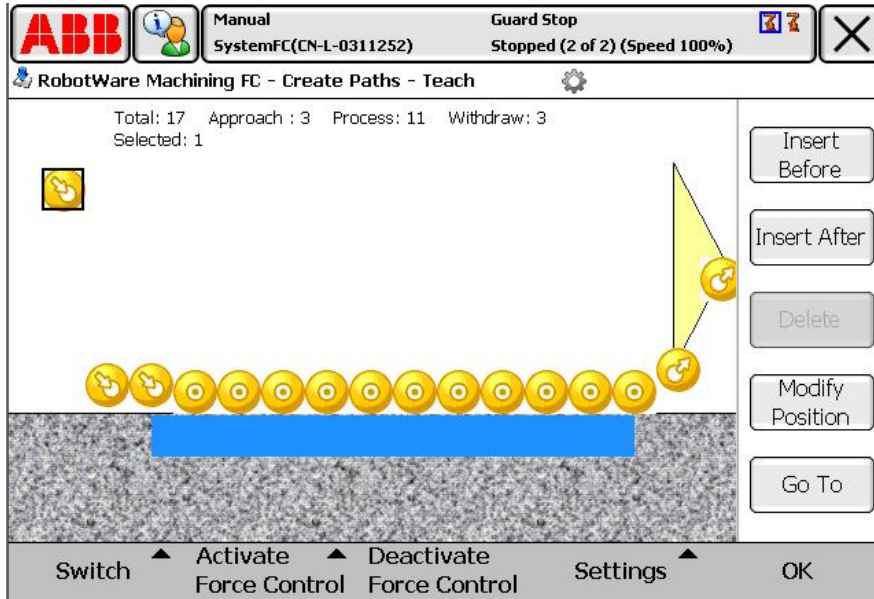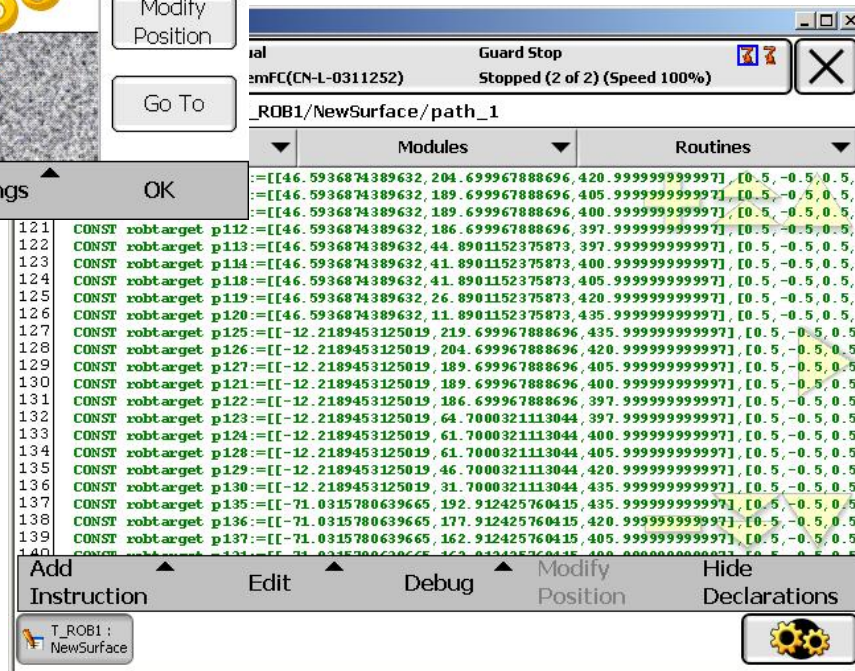
Target modification

- ## Path View

Path simulation

- ## Path view

Program Export

- Export as RW Machining FC interface file

- Export as RAPID program

Additional functions

- **Calibration**
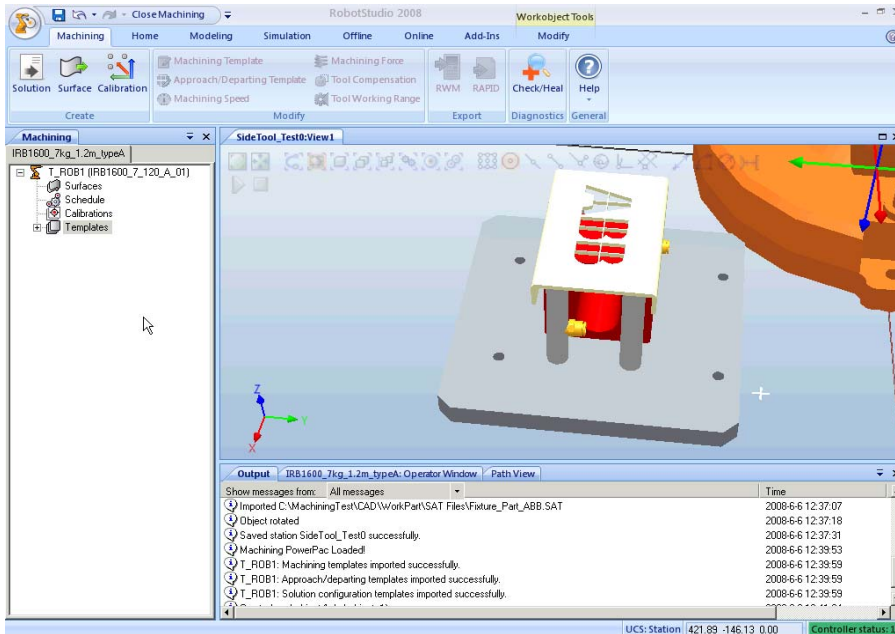
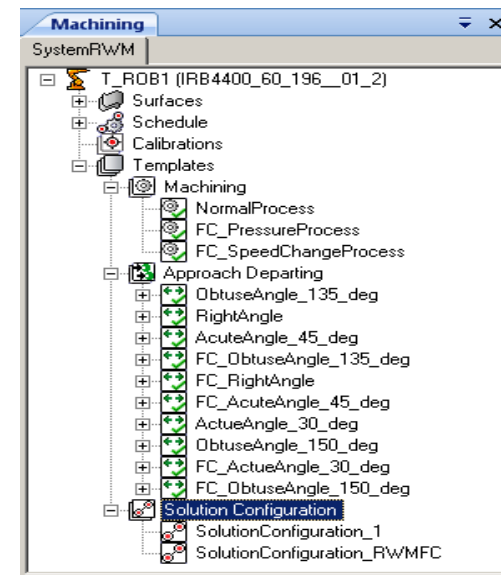- **Check/Heal CAD model**
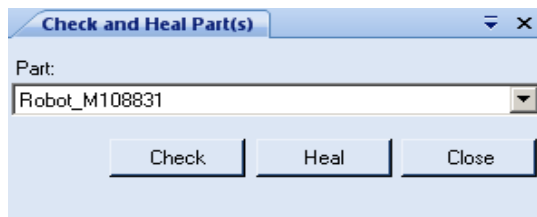
- **Templates**

  - **Machining**

  - **Approach Departing**

 - **Solution Configuration**

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Reduce programming time

- Wizard based programming to set process parameters

    - Automatic path configuration and path optimization

- CAD model used as base to create path

    - Select surfaces and/or edges in a 3D view

- Easy to modify and optimize path through "*Path view*"

- Seamless integrated to RobotStudio

- Functions facilitating knowledge sharing

- Simulation that verify program

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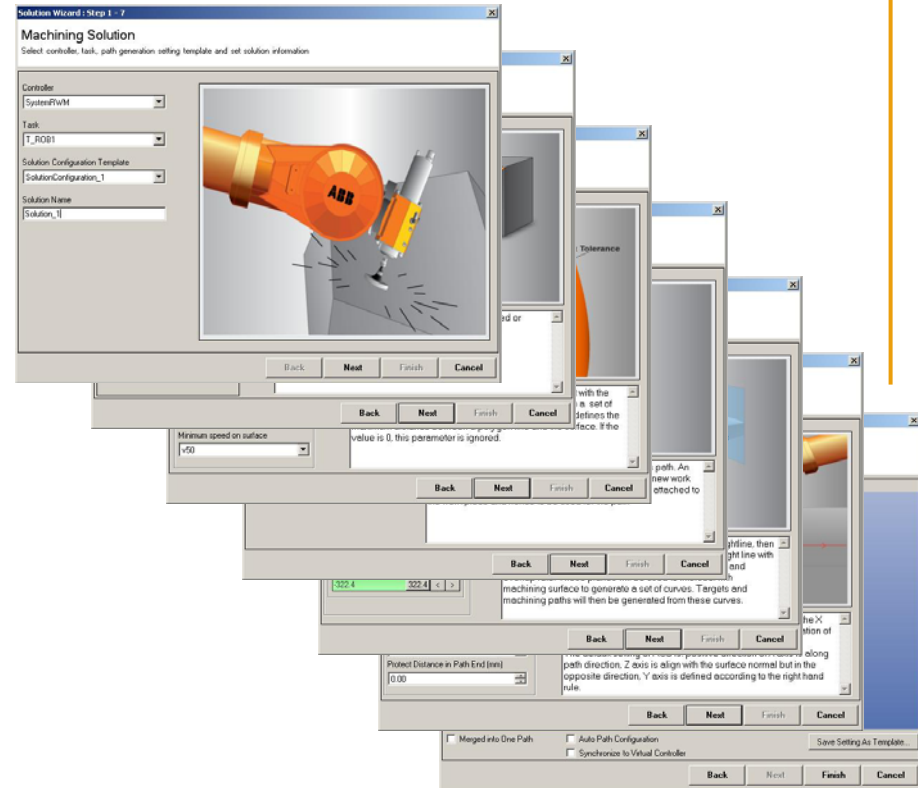
In control of the process parameters

- Templates for different machining processes

  - Including templates for force controlled machining

- Optimization of speed within given range

- Supporting both face- and side working tools

  - Automatic calculation of spin angle and tool compensation of tool radius

- Pre-defined path generation patterns supporting all possible machining types

- Easy creation and modification of path and target parameters
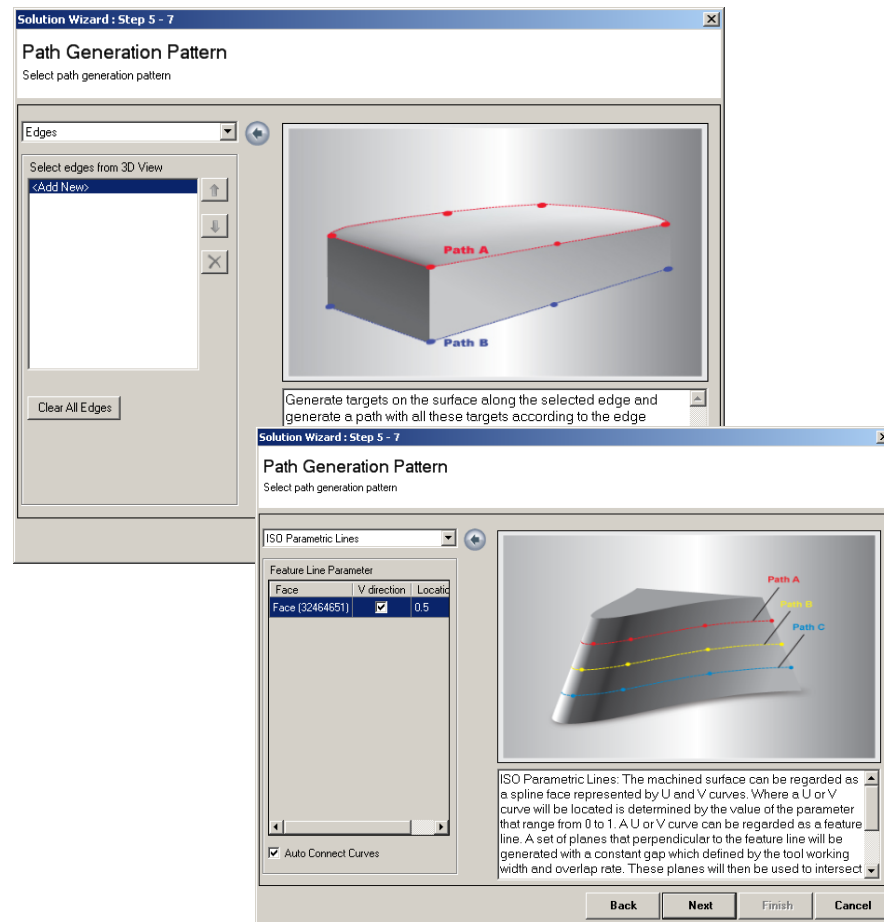
Improved path accuracy

- High path accuracy in relation to CAD model

  - Automatic calculation of tolerance and deviation angle

- Calibration function allow easy way to calibrate work object

  - All robot targets are relative to the work object.
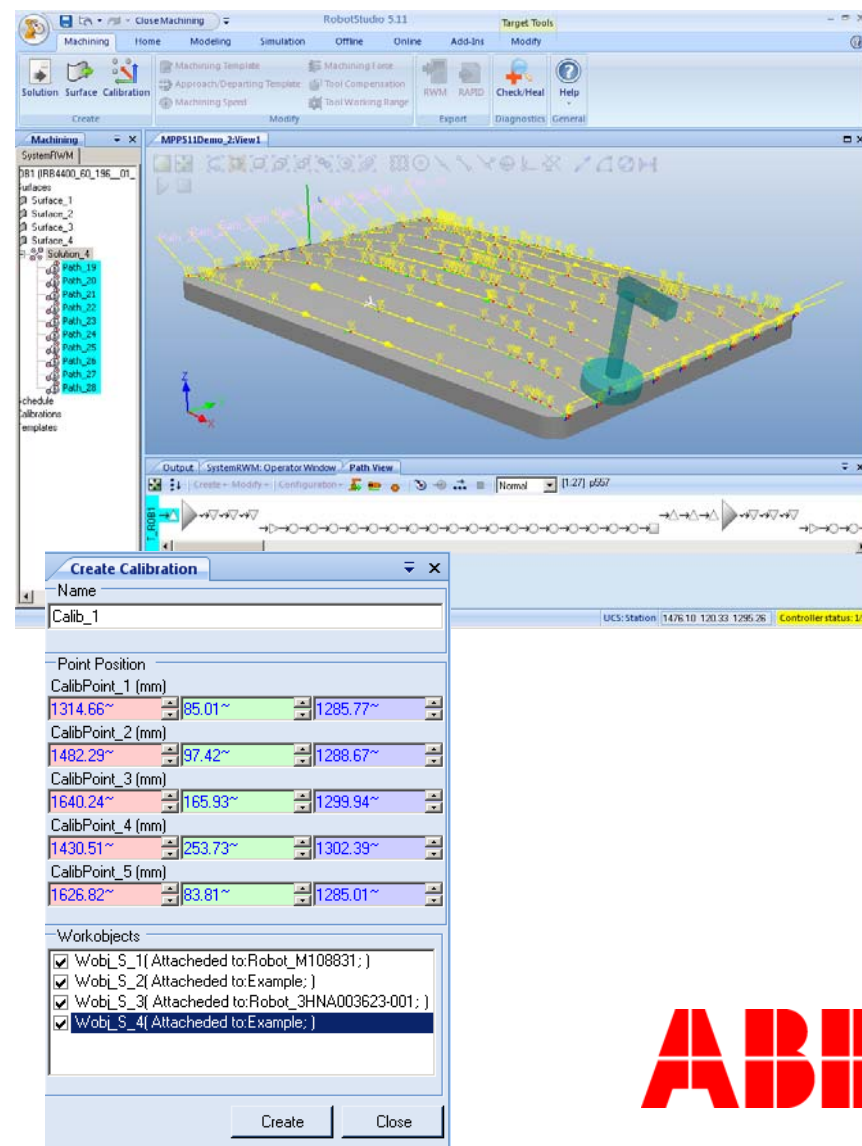
Seamless integration with RobotWare

- Export path(s) as RAPID program

- Export paths(s) as RW Machining FC

  - Force controlled machining

  - Interface file created
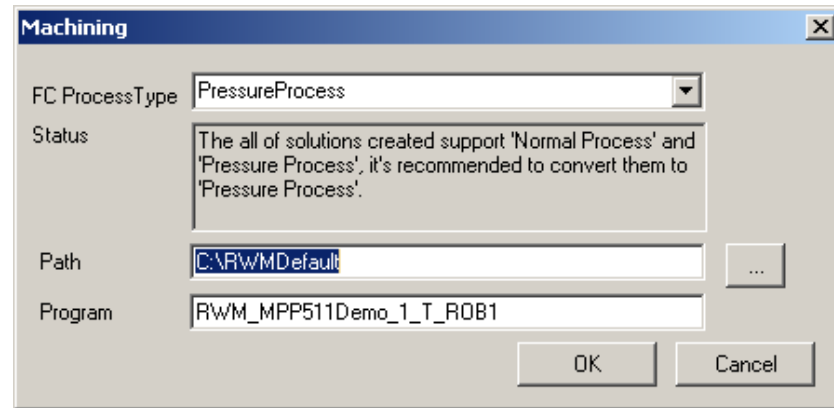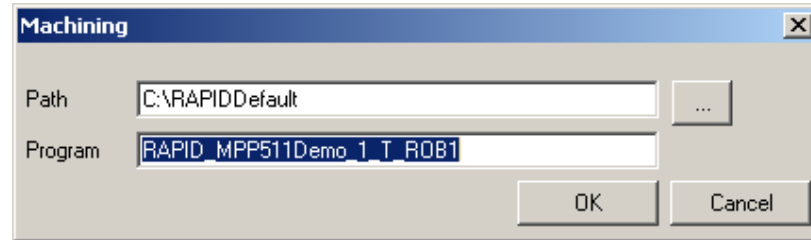
Summary benefits

- Reduce programming time

  - Engineering and commissioning efficiency

  - More cost efficient handling of short batches

- In control of the process parameters

  - Easy to create and modify robot parameters

- Improved path accuracy

- Seamless integration with RobotWare

![ABB logo]

Power and productivity
for a better world™

![ABB logo]