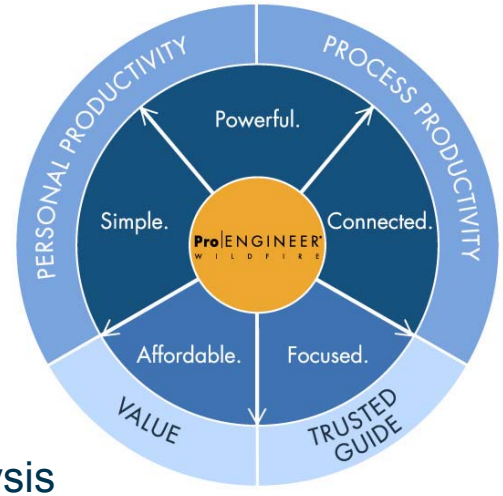
Pro/ENGINEER Wildfire 3.0
Technical Presentation

Pro/ENGINEER Product Strategy

SIMPLE POWERFUL CONNECTED

Provide superior capabilities in an easy-to-use, easy-to-learn, scalable suite solutions, providing the right capabilities at the right price point.



Completely address the needs of discrete manufacturers throughout the product development process, with capabilities for:

- Conceptual and Industrial Design
- Detailed Design
- Routed Systems and ECAD Interfaces
- Simulation and Analysis
- Manufacturing and Production
- Customization and Exchange of CAD Data

Serve as an integral component of PTC's Product Development System, delivering the best "Create" capabilities found in any CAD/CAM/CAE system.

Pro/ENGINEER Wildfire 3.0
Simple

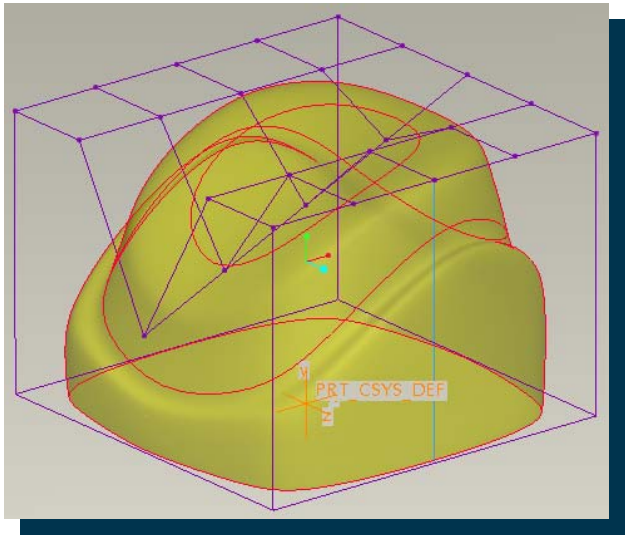
Easy-to-use, Easy-to-learn, Scalable

PTC®
The Product Development Company™

Easier to use Surfacing and Styling capabilities

Pro/E Wildfire User Model for Style and Warp Features

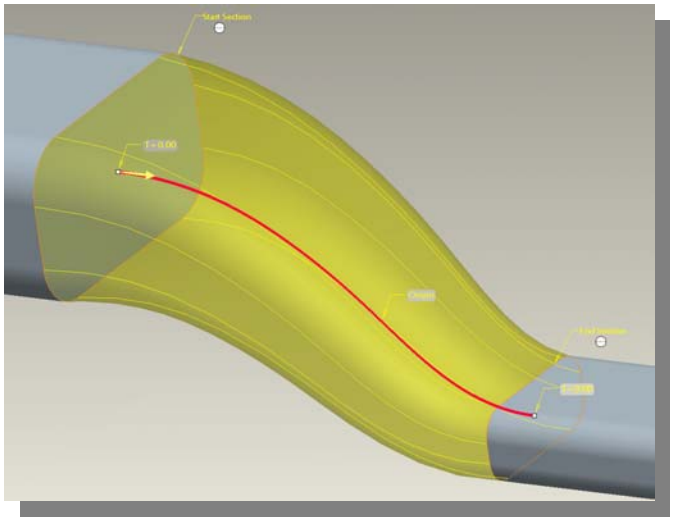
- Improved selection & collection; Highlighting
- Improve graphic handles

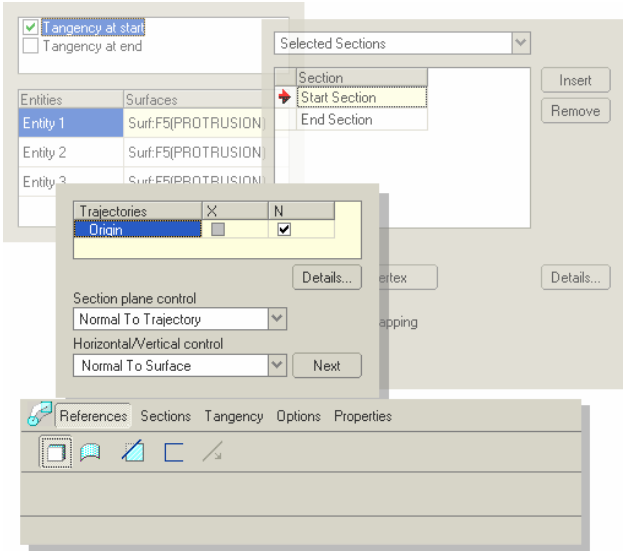


Introduce Lightweight Preview for Warp Features

Modernize the Swept Blend Feature

- Dashboard; Interactive Preview; Multiple Sections





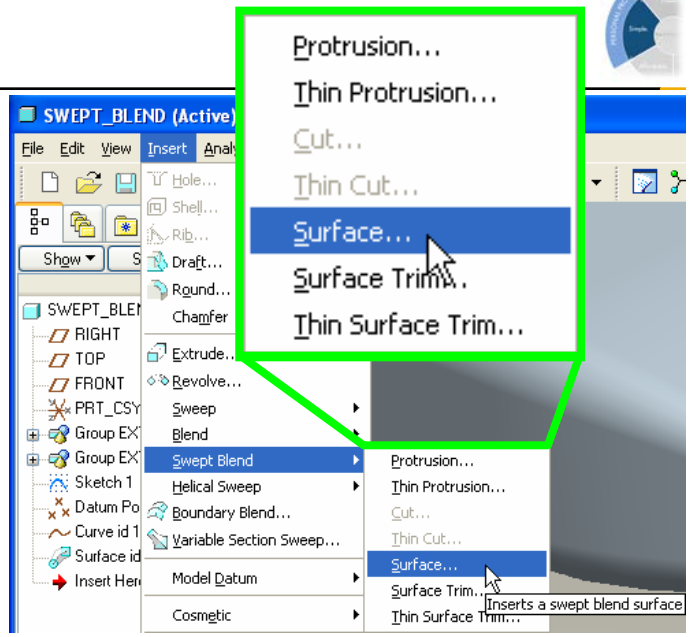
Modernize Swept Blend Feature

Modern, Consolidated, Interactive GUI with Immediate Preview

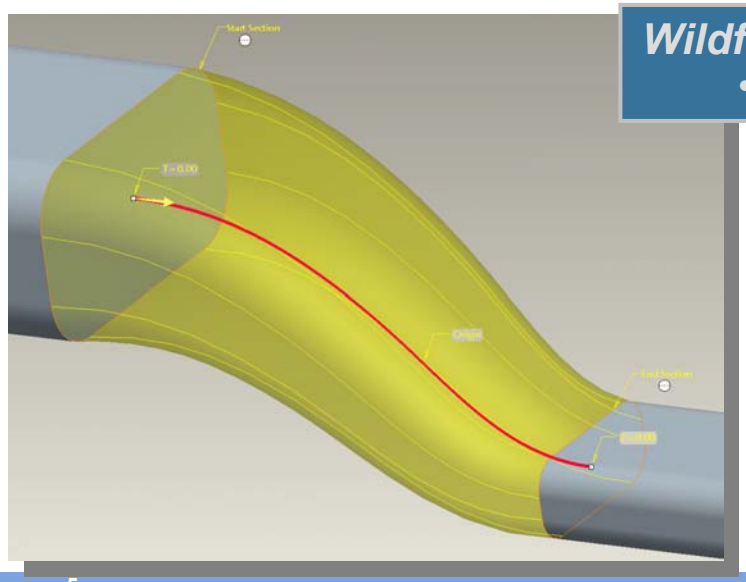
Single Tool for different types of geometry (solid, surface, cut, thin…)

- Effortless change from one feature type to another within same tool

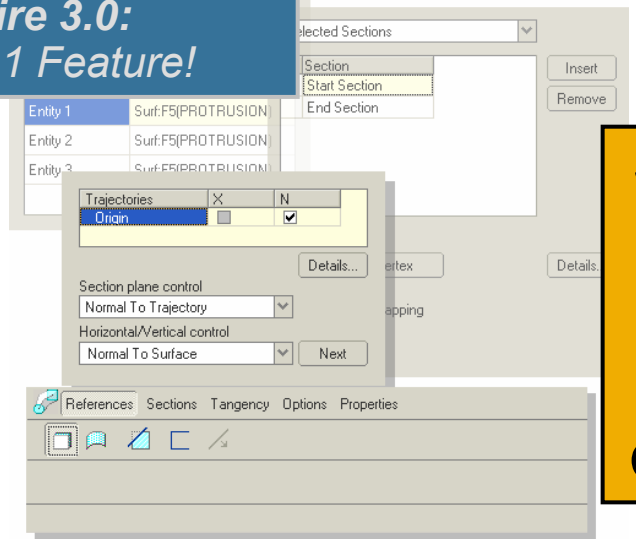
User *Efficiency* and *Productivity* Greatly Enhanced!



Wildfire 2.0:
•7 Features



Wildfire 3.0:
•1 Feature!



Single, Consistent Modern GUI.

Reducing Seven features to One!

Greater Efficiency!

Modernize Swept Blend Feature

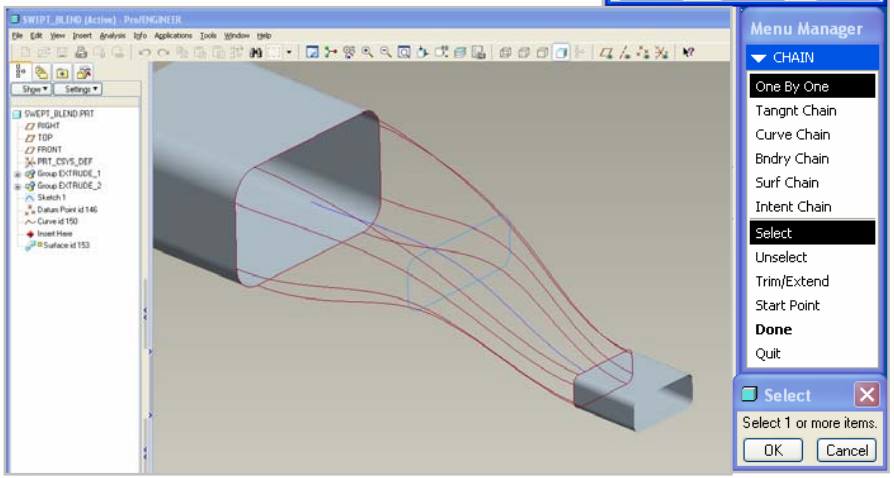
Productivity, Usability, Capability Gain!

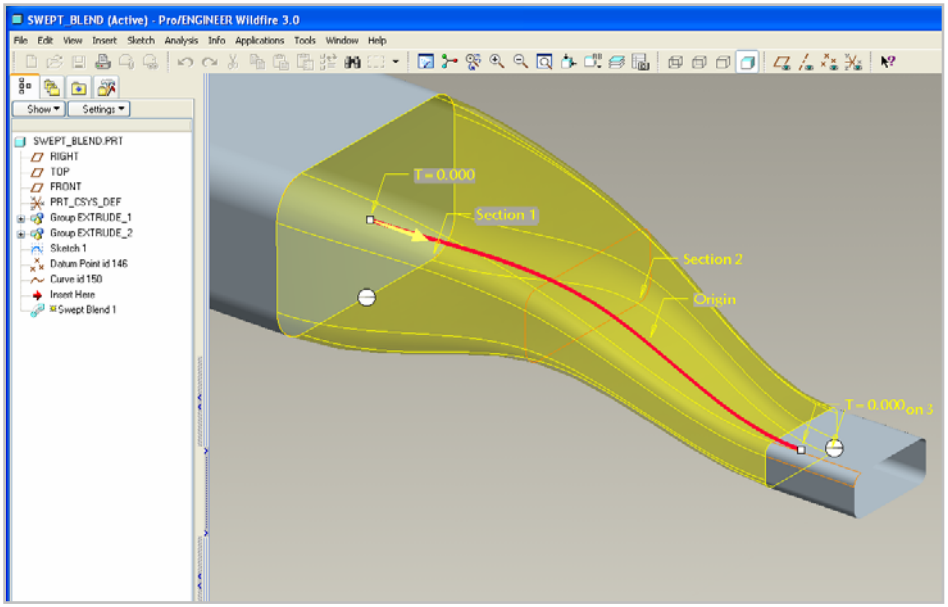
Wildfire 3.0:

- *Interactive*
- *All commands at fingertips!*
- *1 Feature!*
- *1 minute!*

Wildfire 2.0:

- *Menu Based*
- *57 clicks for only one feature type (repeat for every other)!*
- *10 to 12 minutes.*





10 X Faster!

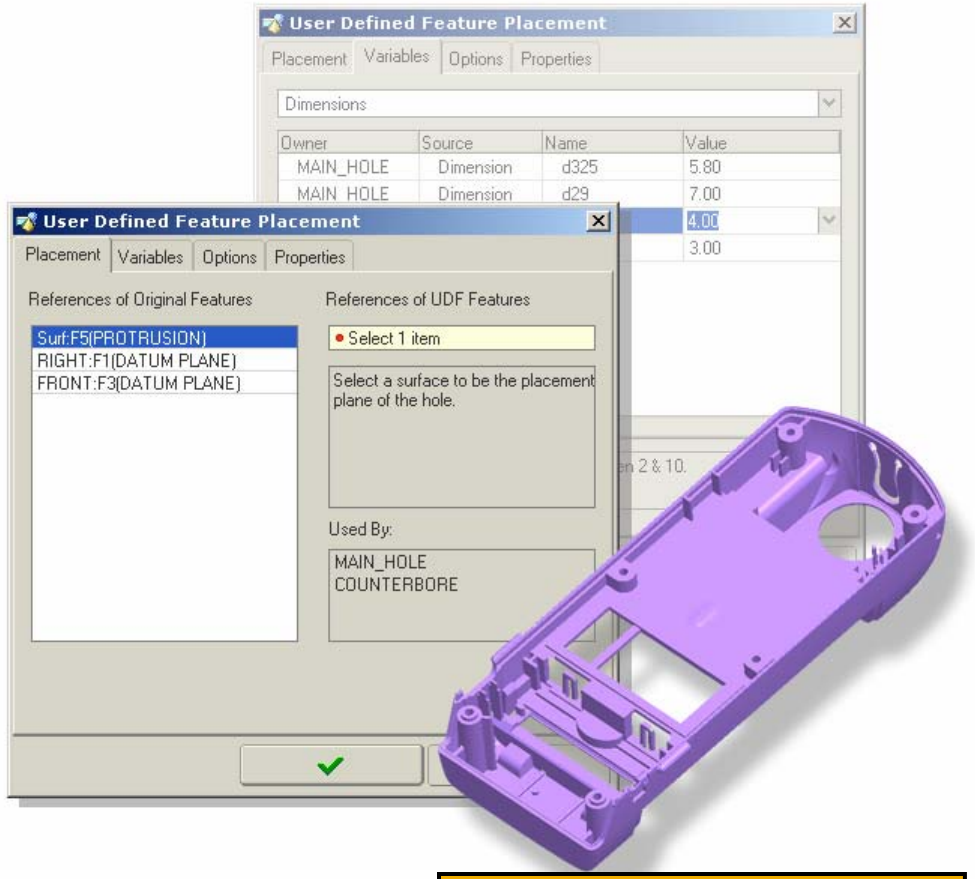
More Flexible Feature Operations

Modernize UDF Placement

- New UI Similar to Copy/Paste Special
- Single Dialog for all variations
- Edit definition of features during placement for maximum flexibility
- Consolidated variable List
- Updated Preview to aid direction flipping and quadrant selection

Improved Copy & Paste

- Clipboard Concept enables repeated Paste



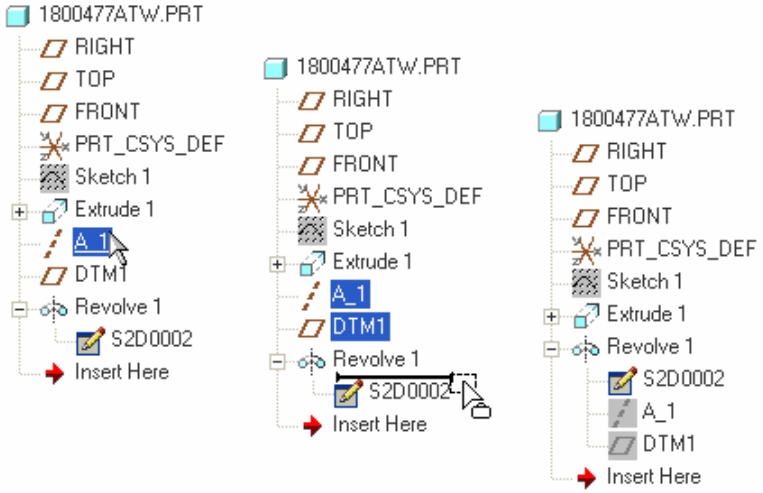
Single, Consistent Modern GUI.

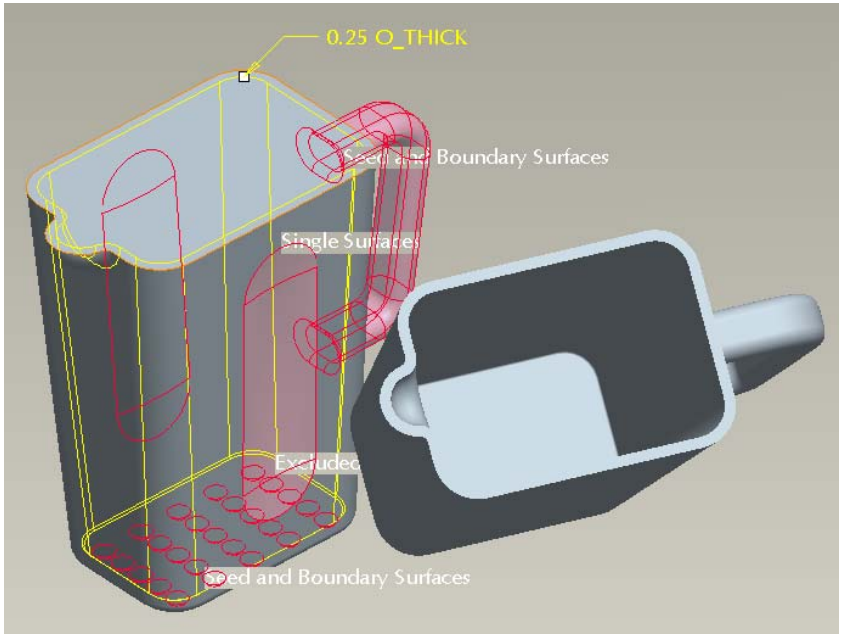
Greater Efficiency!

More Flexible Feature Operations

Embedded Datum Features -- Solving the Make Datum problem

- Asynchronous Datum Features are embedded and hidden
- Drag-and-Drop parent datum into features to embed
- All dimensions are available on feature selection





Partial Shell

- Exclude portions of model from the shell
- Useful in case where reorder is difficult or impossible (e.g. imported models)

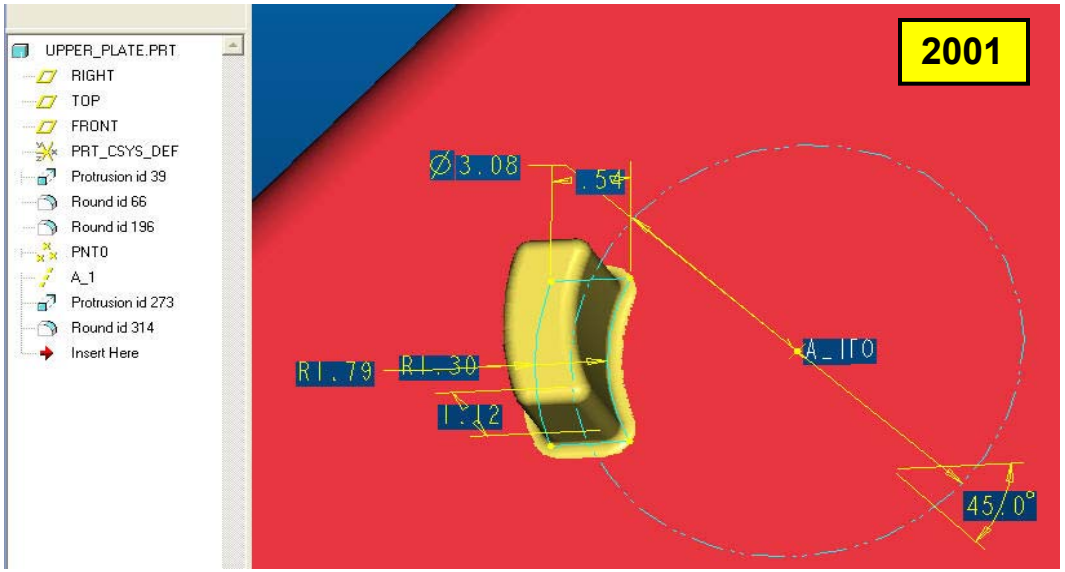
Make Datums & Asynchronous Datums

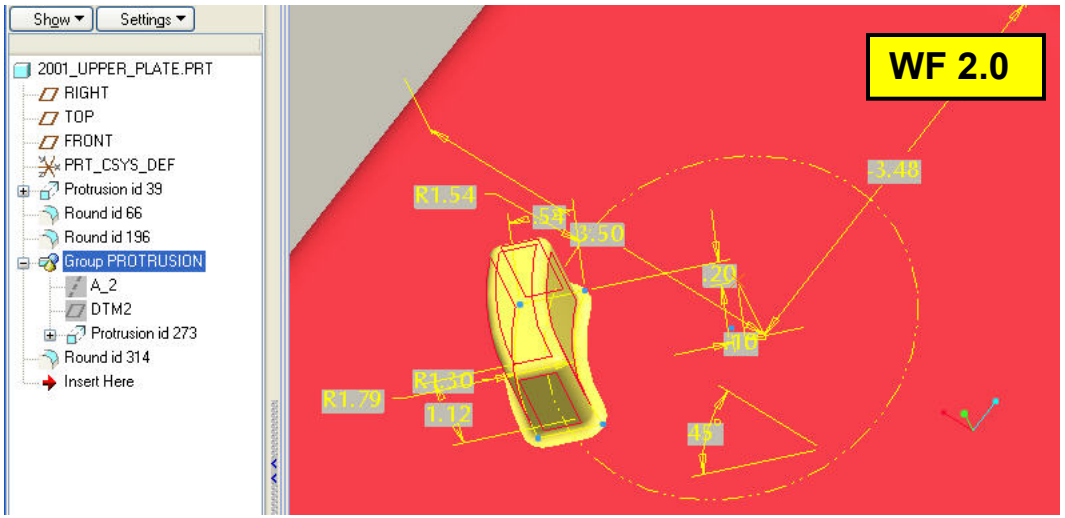
2001

- Only Planes
- No Grouping
- No Reuse
- Difficult to communicate methods

Wildfire 2.0

- All Datums
- Grouping
- Reuse of Datums available
- Cluttered Model Tree
- No direct selection of groups

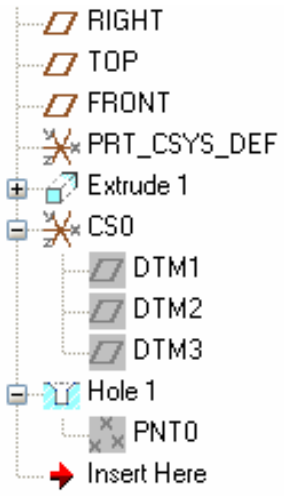




Embedded Datums

Wildfire 3.0

- Easier referencing
  - Sketch based features
  - Engineering features
  - Other Datums
- Drag-and-Drop capabilities
- Edit definition on all embedded datums
- Display all dimensions used to create the feature
- Reduce the use of Group operations

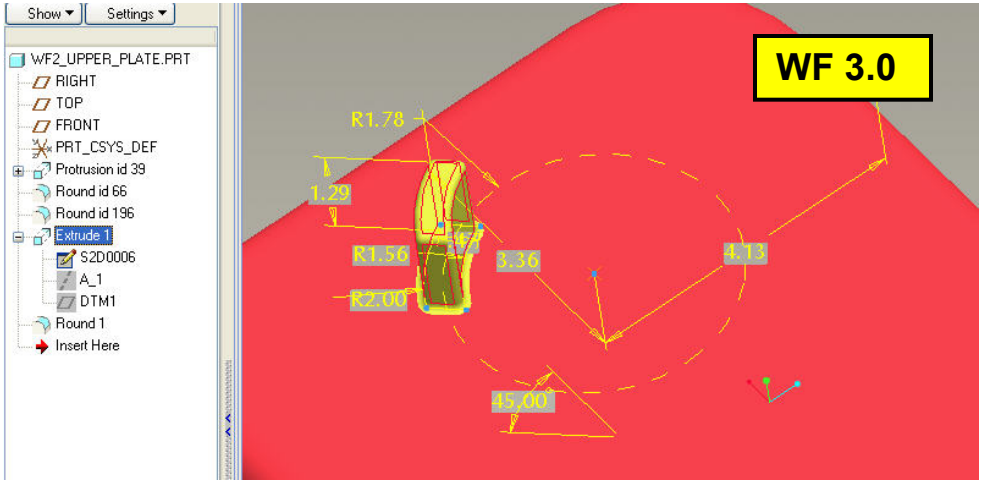


Quick Edit of all Dimensions!

From 5 picks to 1!

Embed design intent directly in any feature!

Cleaner Model Tree



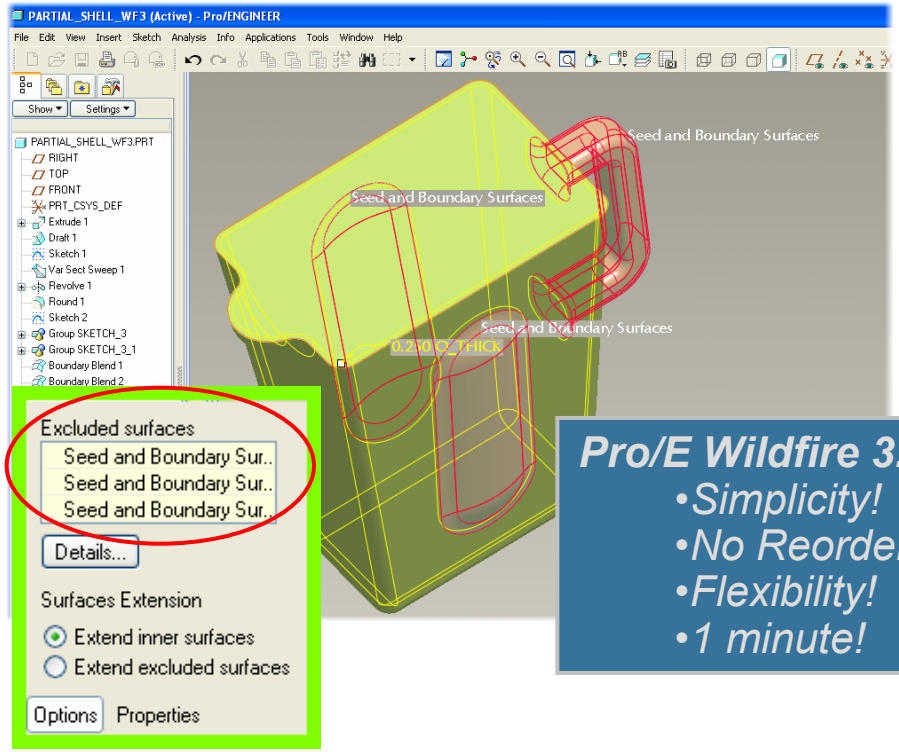
Partial Shell

Productivity, Usability, Capability Gain!

- Exclude portions of model from the shell
- Essential where reorder is difficult or impossible (e.g. imported models)

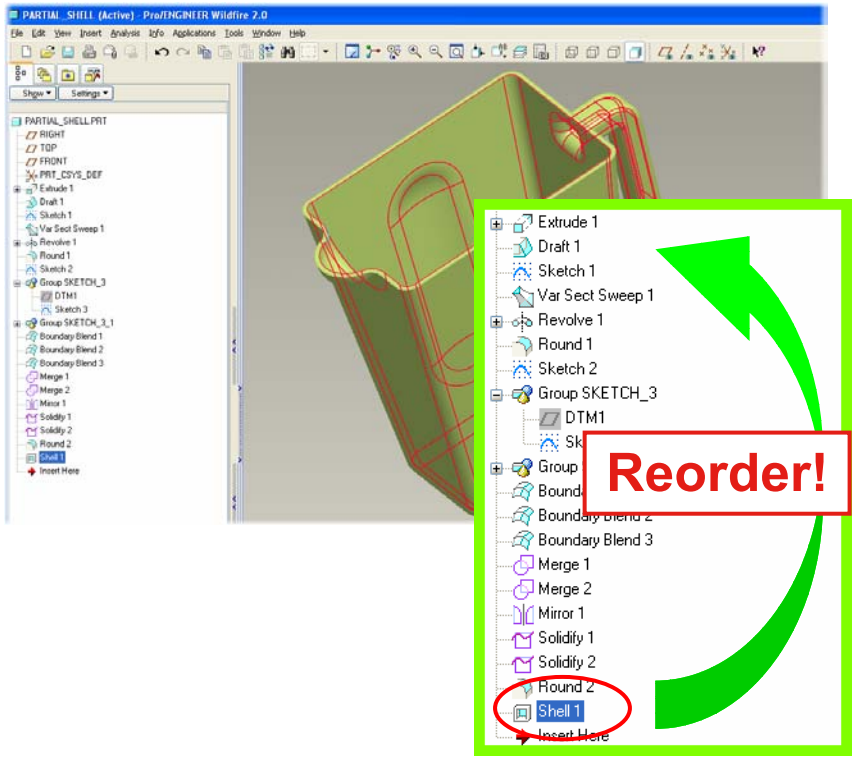
Pro/E Wildfire 2.0:

- *More Complex!*
- *Need to think about feature order!*
- *Reordering may be impossible due to parent-child relations!*
- *5 - ∞ Minutes!*



Pro/E Wildfire 3.0:

- *Simplicity!*
- *No Reorder!*
- *Flexibility!*
- *1 minute!*



5 X Faster!

Most Robust Patterning in any CAD tool

Curve Pattern

- Easily control spacing or # of instances

Fill Pattern Origin Control

- Easy inclusion/exclusion of instances on boundary

Projection and Orientation of Fill Patterns

- Previously not possible on curved surfaces

Pattern of a Pattern

- For Dim, Ref, Axis, Table group pattern

Reference Pattern Preview

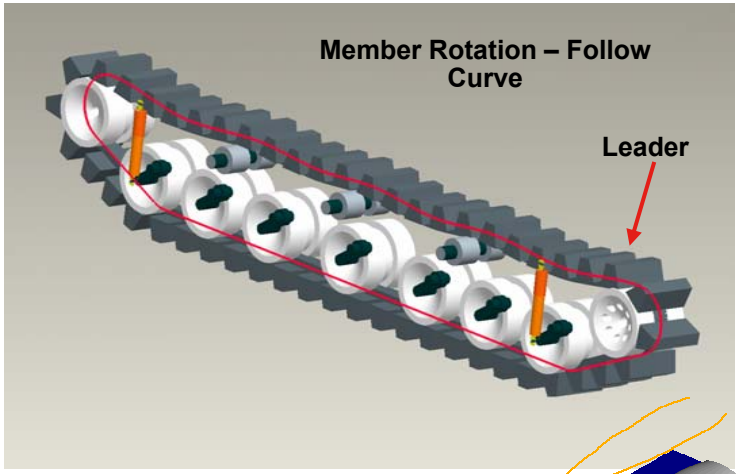
- Can exclude members

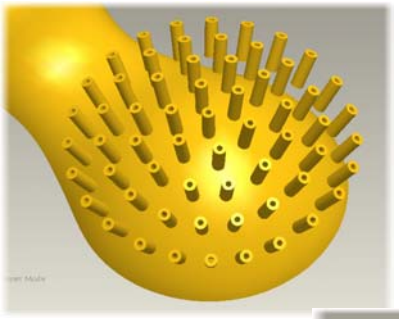
Move/Mirror of Fill/Direction/Axis Patterns

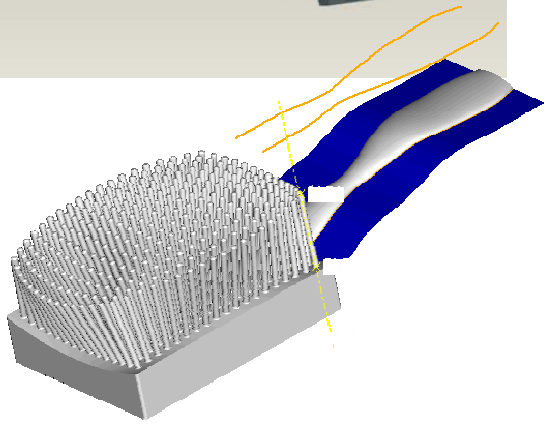
- Not Possible in WF2.0

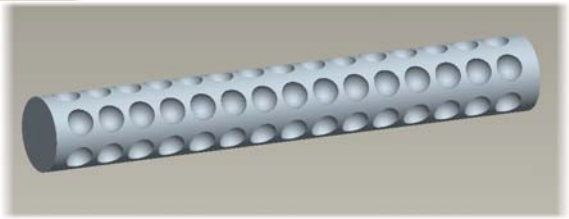
Graphical Feedback and Interaction for Pattern Parameters

- Fill pattern parameters (i.e. spacing) were not exposed as dimensions previously









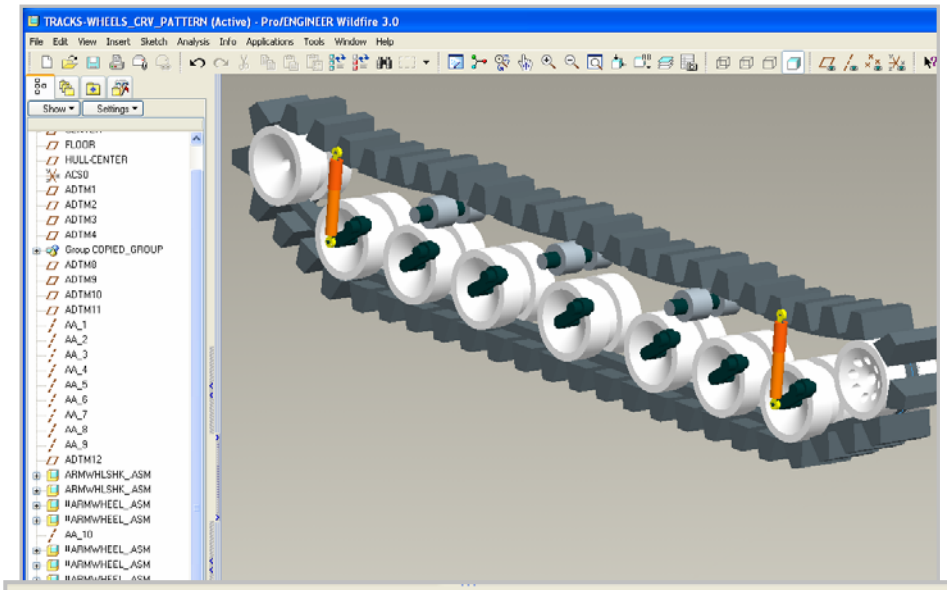
Curve Pattern

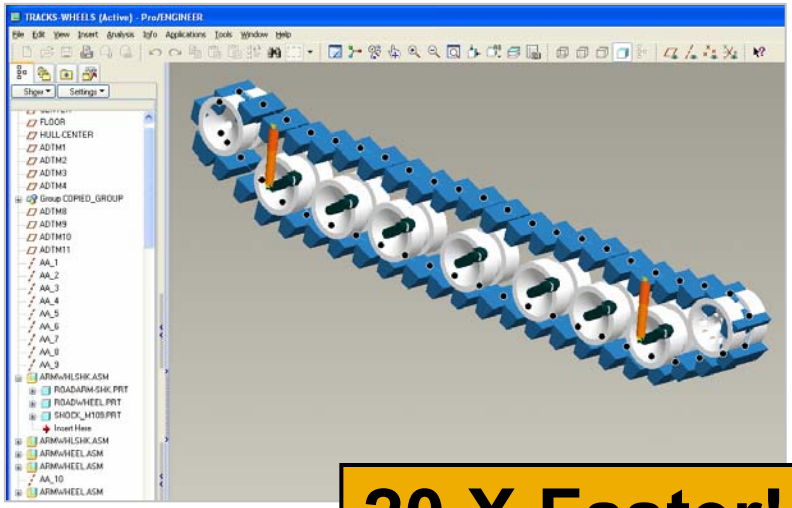
Increased Usability, Capability and Productivity!

- Easy control of spacing or # of instances
- Instance orientation follows curve contour

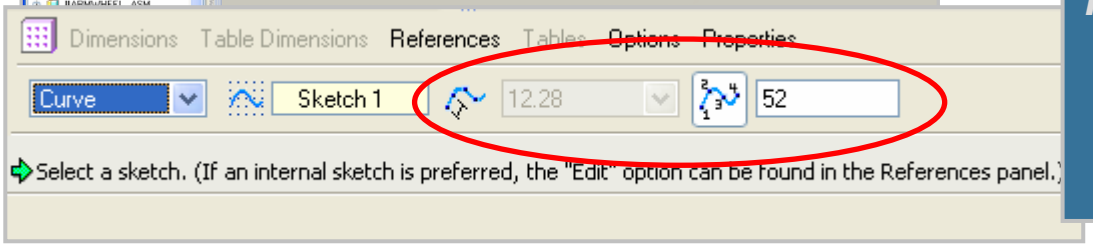
Pro/E Wildfire 2.0:

- *Needs Relation to calculate Increment!*
- *Does not automatically orient along curve!*
- *Needs patterned feature constrained to curve!*
- *At least 5 extra features (construction datums)*
- *20 minutes!*





20 X Faster!



Pro/E Wildfire 3.0:

- *2 mouse clicks!*
- *1 value input for either spacing or # of instances!*
- *1 Minute!*

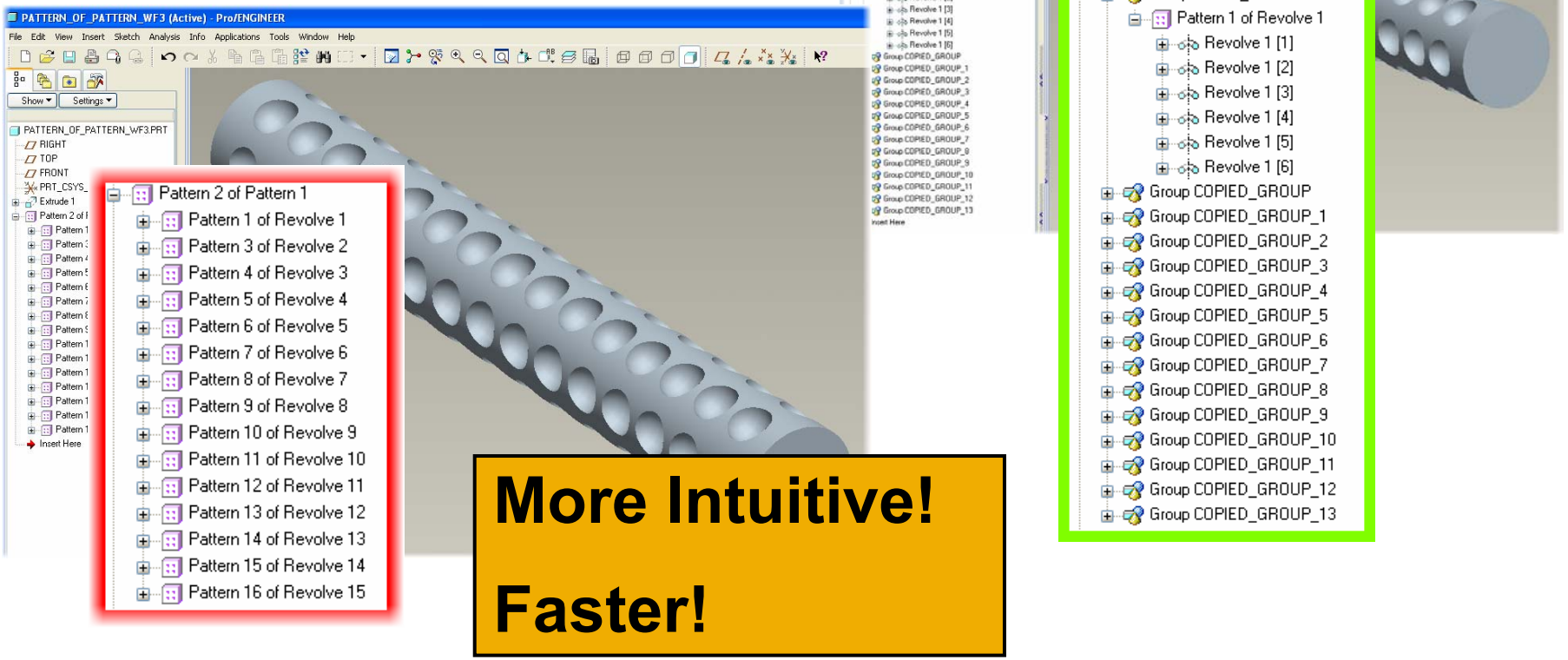
Pattern of Pattern

Pro/E Wildfire 2.0:

- *Need to Group first! (extra, non-intuitive step)*
- *Deeper and more complex Model Tree!*

Pro/E Wildfire 3.0:

- *Less mouse clicks!*
- *More Intuitive!*
- *Smoother workflow!*
- *Cleaner Model Tree!*



More Intuitive!

Faster!

Projection and Orientation of Fill Patterns

Fill Pattern not possible on curved surfaces in WF2.0 (only flat)!

Pro/E Wildfire 3.0:

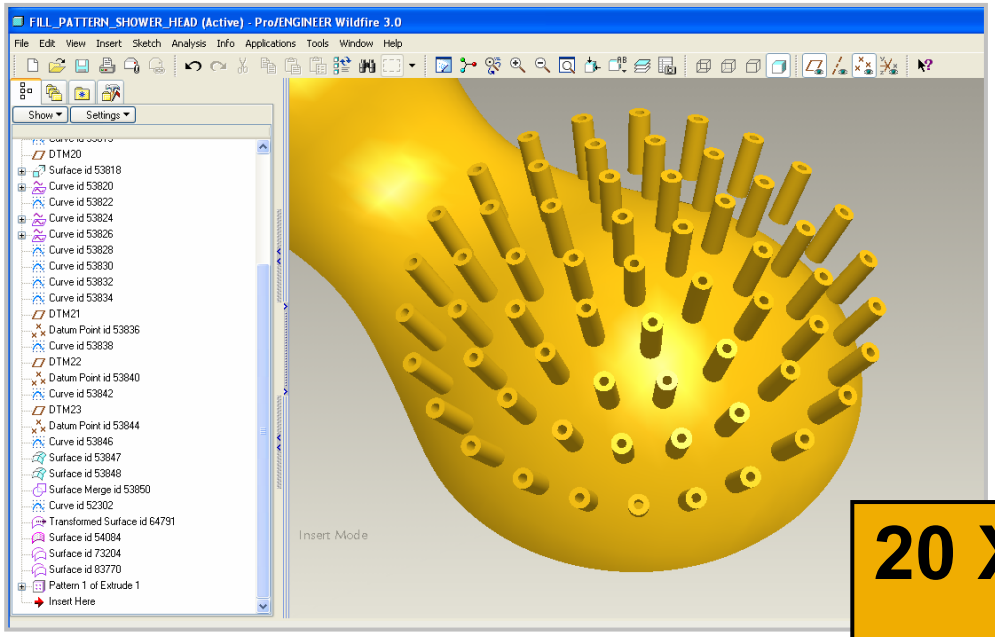
- *No construction features!*
- *Greater Flexibility and Capability!*
- *1 minute!*

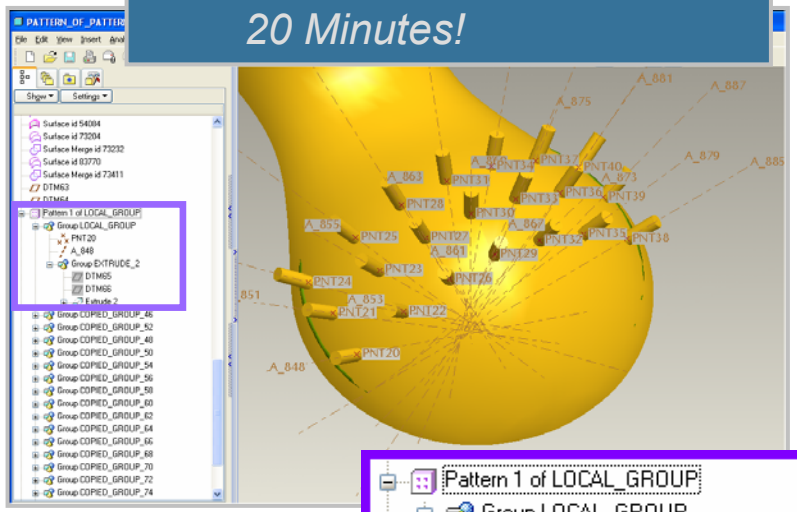
Pro/E Wildfire 2.0:

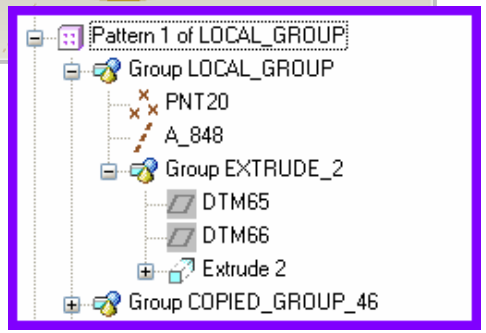
- *Cannot complete the task*
- *(Dimensional Pattern)!*
- *Cannot control Fill area!*

4 construction features!

20 Minutes!







20 X Faster!

More Capable!

Easier Sketching

Cut, Copy and Paste

Maintain Locked Dims outside of sketcher

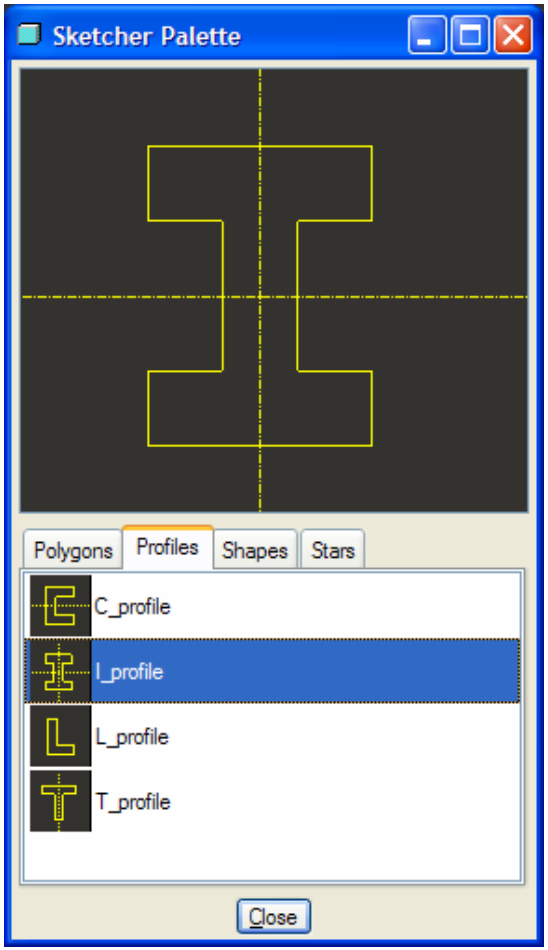
Incorporate orientation inside sketcher

- New workflows to enter and exit sketcher
- Dynamic preview while defining/redefining orientation
- Increased stability when redefining orientation
- Determine a sketcher orientation when none exists

Sketcher Palette

Sketcher Performance

- More predictive behavior while sketching – existing entities will not “jump”



Pro/E Wildfire 3.0 Sketcher Performance Tests execute 70-85% faster than Pro/E Wildfire 2.0. Sketcher won’t slow you down!

Easier Sketching - Easier reuse through new Sketcher Palette

Capture and sort commonly used sections and present them to users in Pro/ENGINEER.

- Display and reuse company standard sections or sections saved in working directory
- Organize the sections in custom palette tabs

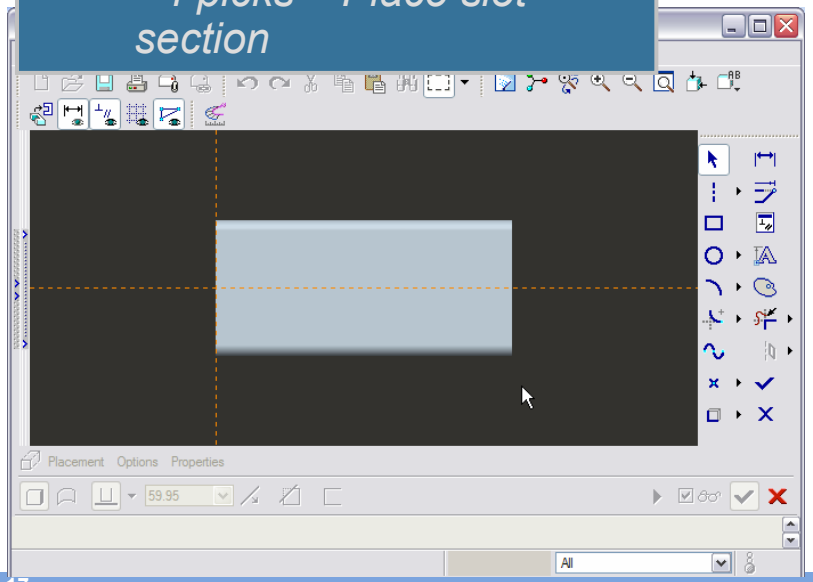
Pro/E provides default sections in the palette; such as polygons and general shapes. These can be modified and enhanced by users.

Users are no longer forced to search for sections on the network….

…Users can simply click, pick and place from the sketcher palette.

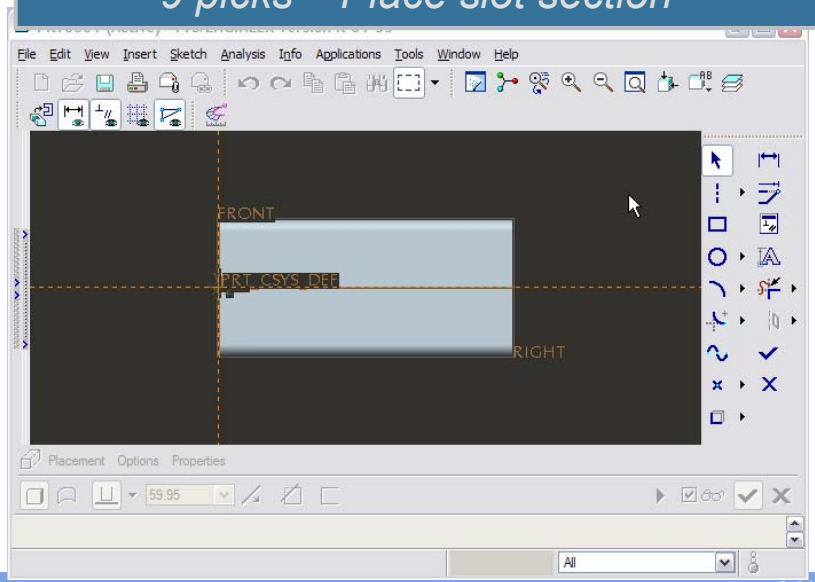
Wildfire 3.0:

• 4 picks – Place slot section



Wildfire 2.0:

• 9 picks – Place slot section



Easier Sketching - Improved Sketcher Workflow

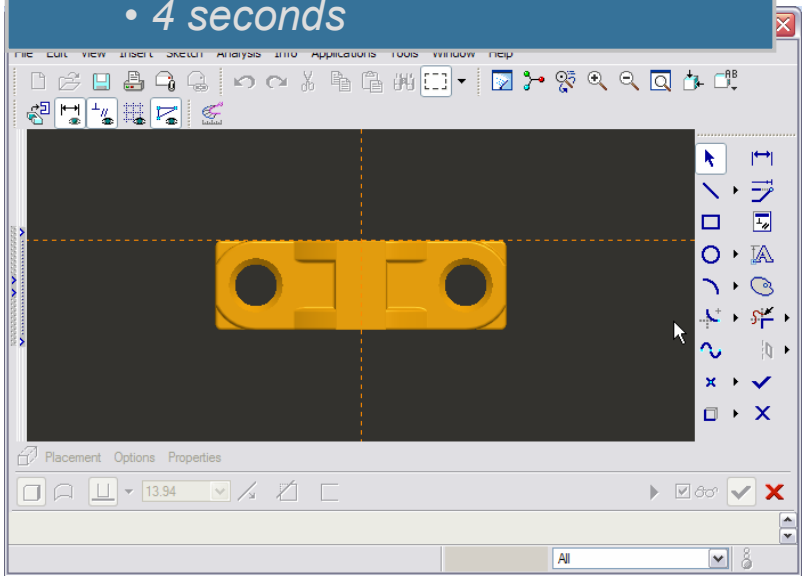
Exiting sketcher has never been easier!

- In the unlikely event, users need to exit sketcher or the entire feature, no longer are they inundated with message prompts to simply perform an exit……..just click, accept and exit!

Picks reduced by 50% to exit sketcher and reduced by 66% to exit the feature from sketcher.

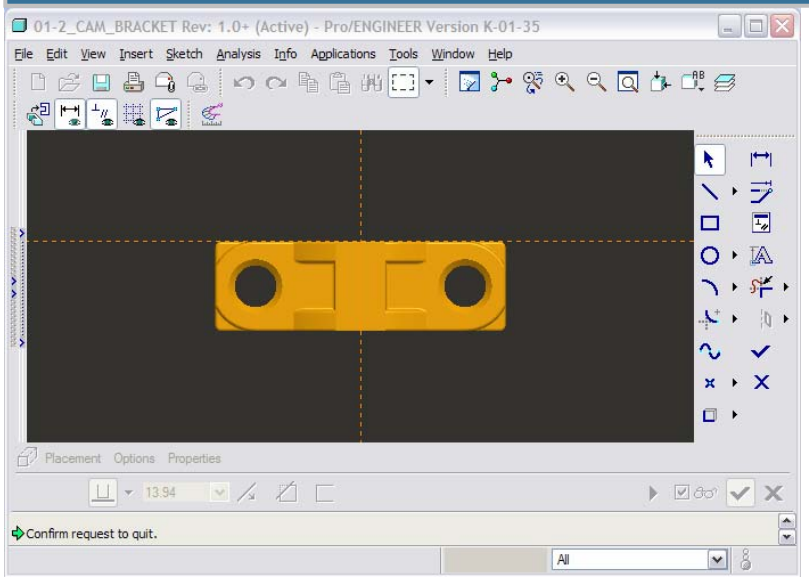
Wildfire 3.0:

- *2 picks – Exit sketcher and feature*
- *4 seconds*



Wildfire 2.0:

- *6 picks – Exit sketcher and feature*
- *14 seconds*



Easier Sketching - Increased Sketcher Performance

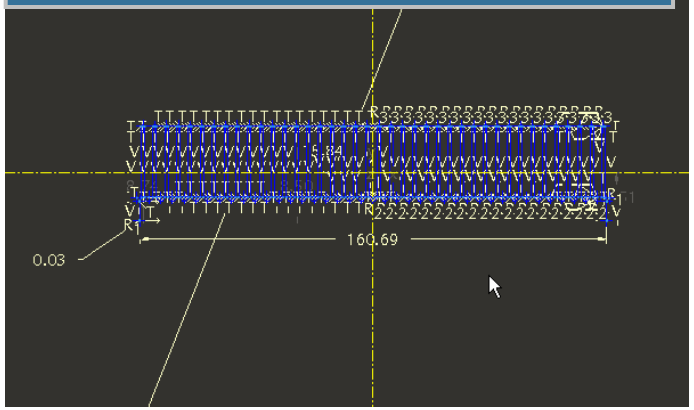
Sketcher performance has drastically been improved primarily when dealing with common tasks; such as:

- Sketching large number of entities (40 or more).
- Adding entities to large sketches.

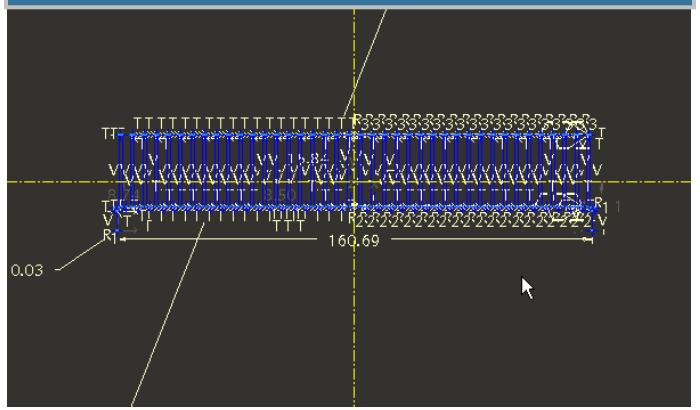
Pro/E Wildfire 3.0 Sketcher Performance Tests execute on average 70-85% faster than Pro/E Wildfire 2.0.

Sketcher won't slow you down!

Wildfire 3.0:
•Creating a straight line took 6 sec.



Wildfire 2.0:
•Creating a straight line took 48 sec.

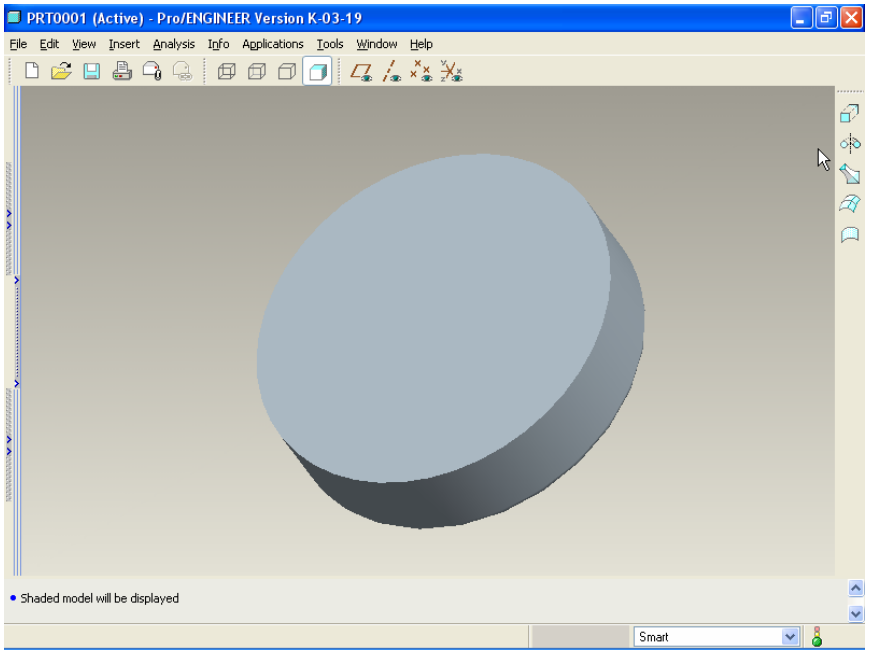


Easier Sketching – Sketch Text Justification

Horizontal and Vertical Justification for Sketched Text.

- Control the placement of the sketched text through 9-points
- Justification of text along a curve
- Avoid the additional features and infrastructure required to place text that was required in Pro/E WF2.0

Place your text is seconds versus minutes in Pro/E Wildfire 3.0, while maintaining the control point position and your design intent.



Added Support of OpenType Fonts (OTF)

- OTF enables cross-platform compatibility and its ability to support expanded character sets and layout features, such as kerning.

Pro/E Wildfire 3.0 is the Only 3D CAD systems to support OpenType Fonts.

Eliminate your dependency on legacy 2D tools, and get the whole job done with one application.

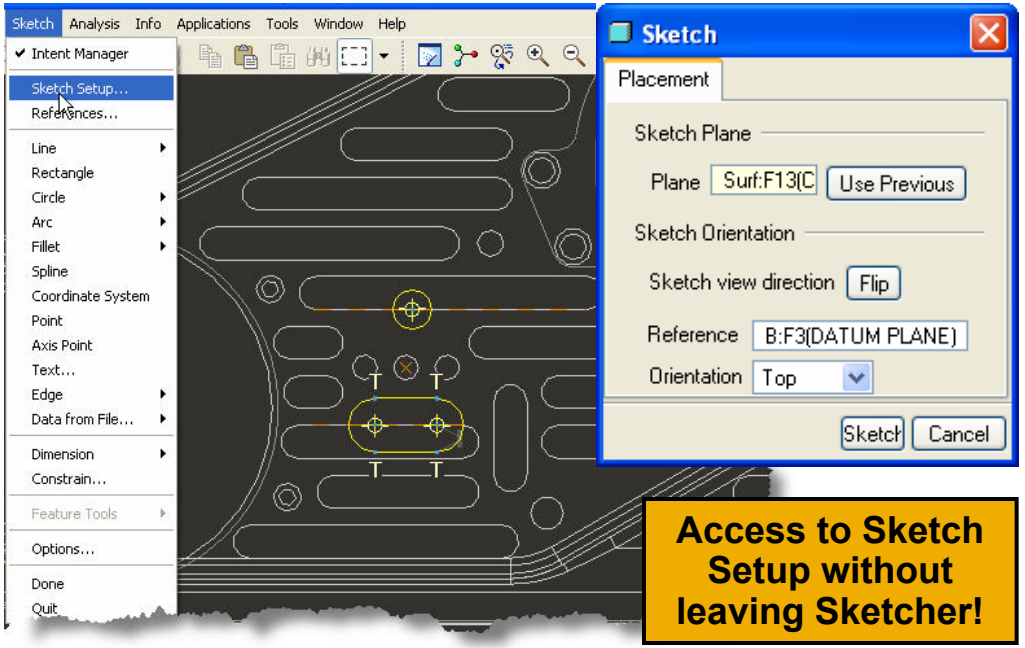
Easier Sketching - Sketcher Setup

Sketch Setup within Sketcher

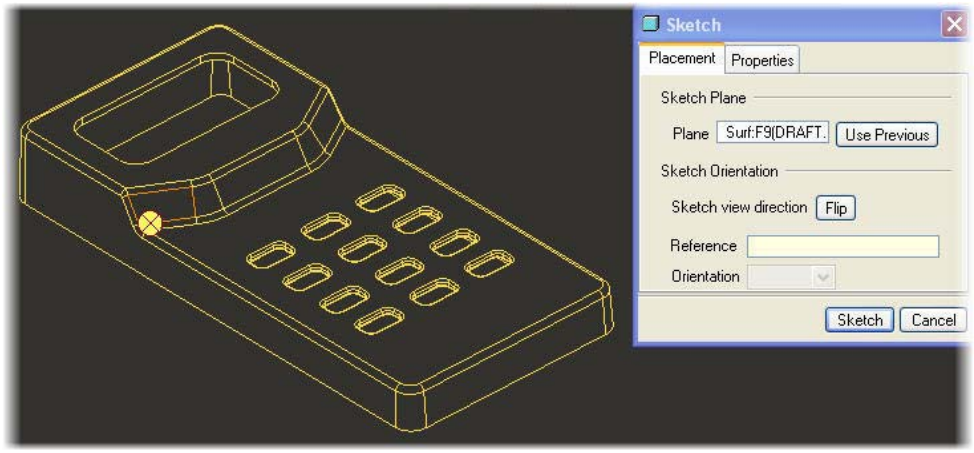
- Change Sketching plane and orientation
- Preserve entity orientation and location

Default orientation when none exists

- Use part default coordinate system
- Define horizontal/vertical from within sketcher if desired



Access to Sketch Setup without leaving Sketcher!



Select Sketch and immediately enter Sketcher. 1 Pick!

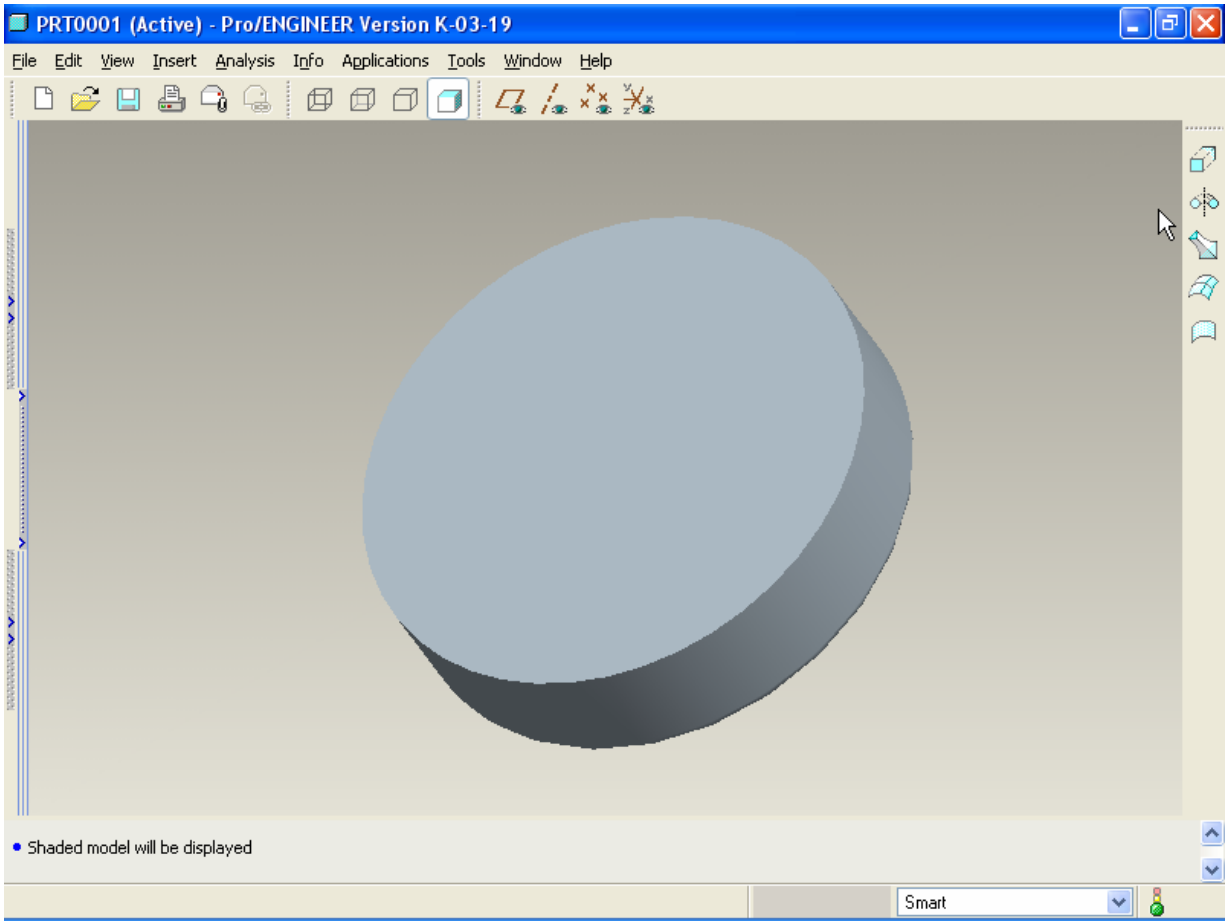
No need to define extra planes!

Easier Sketching

Nine point baseline control for sketched text

Support of Open Type Fonts

- In Sketcher
- As Feature Profiles



Continued Sheetmetal Design UI Overhaul

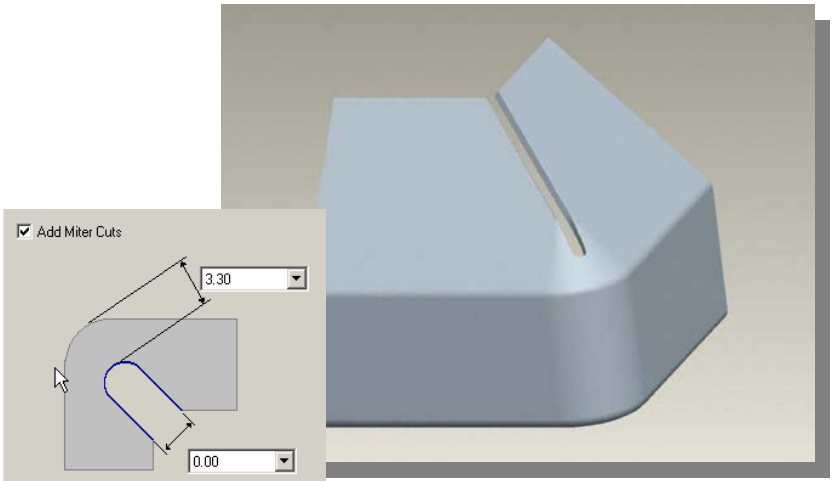
Single operation to create Multiple walls and Miter cut

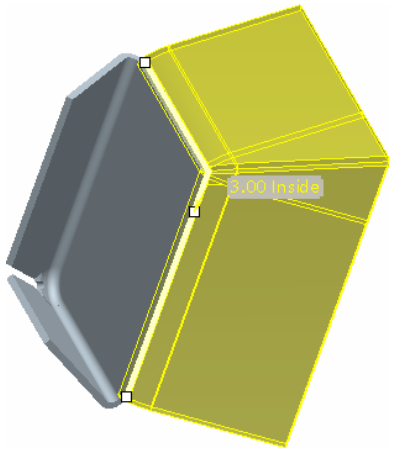
Modern, Graphical UI for Flat and Extruded First Walls

- Dashboard; Interactive Preview

Consolidated Solid/Sheetmetal Cut

Sheetmetal Reports presented in Embedded Browser

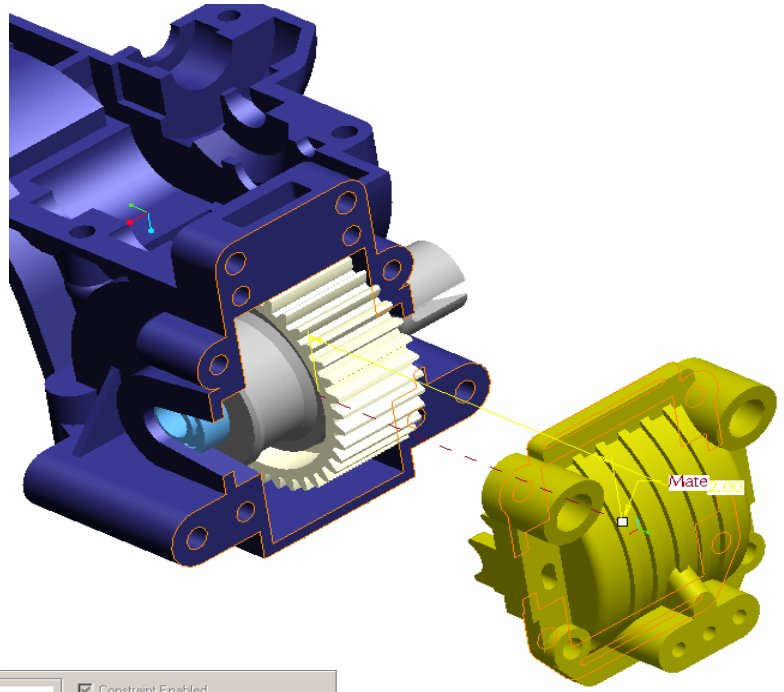


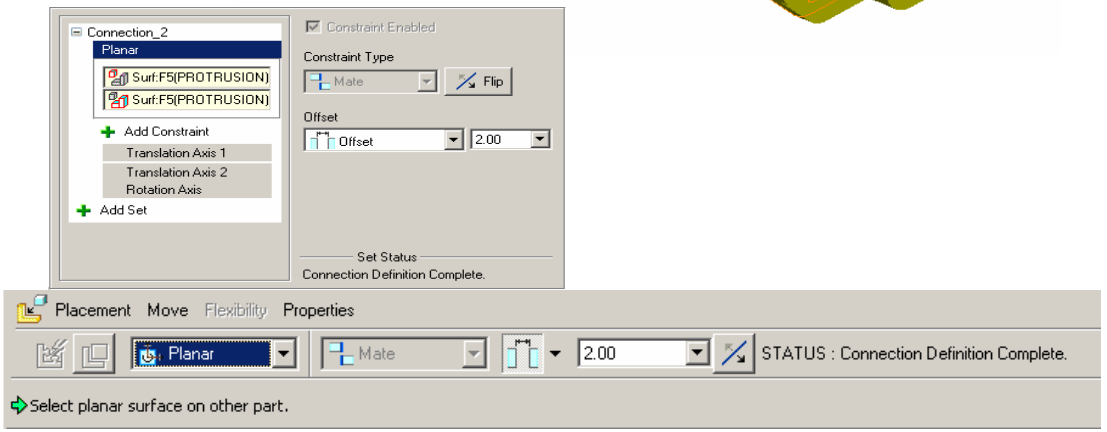


Complete Modernization of GUI for Assembly & Mechanism Design

New Component Placement UI

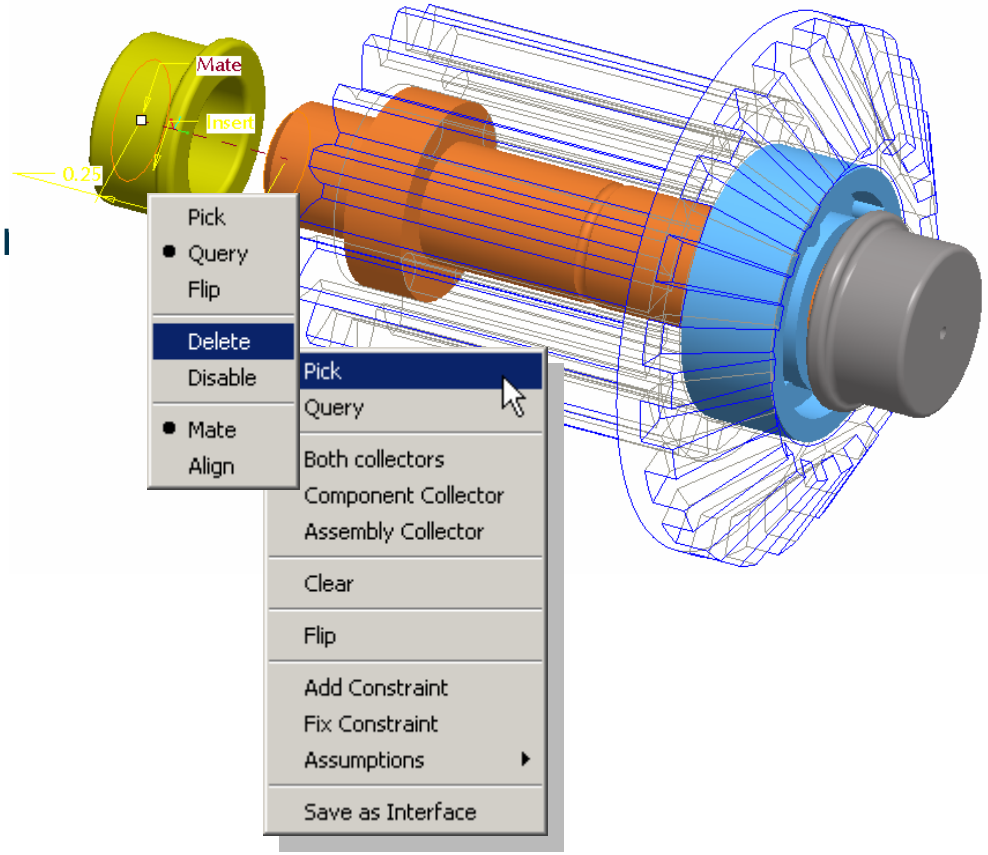
- Wildfire Dashboard UI
- Drag handles for Offset Dimensions
- Right Mouse Button selections for the most common actions
- Define Mechanism Connections within assembly mode
- Define Mechanism Motion Limits during assembly

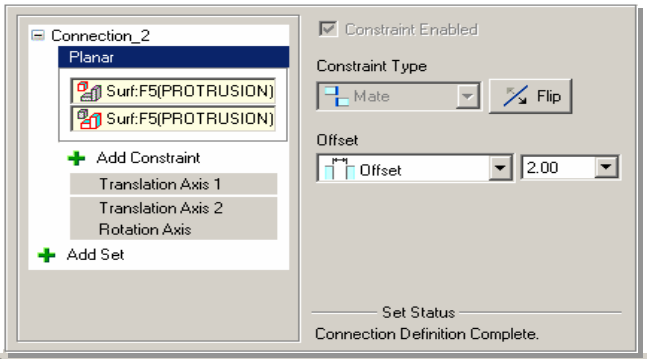


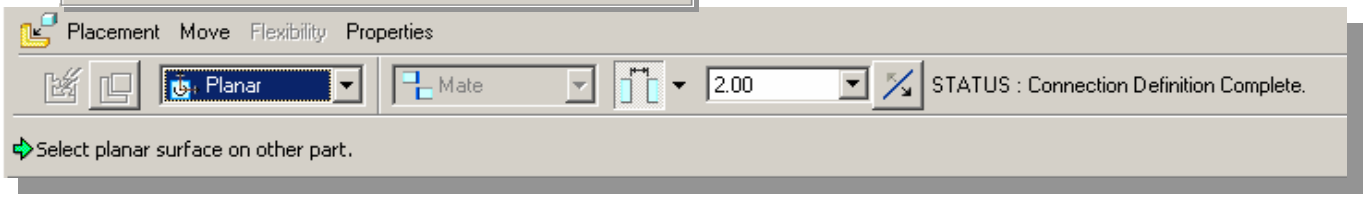


Fast & Easy Component Placement

- On Screen Constraint Tags
- Drag handles
- Right Mouse Button options for placement operations



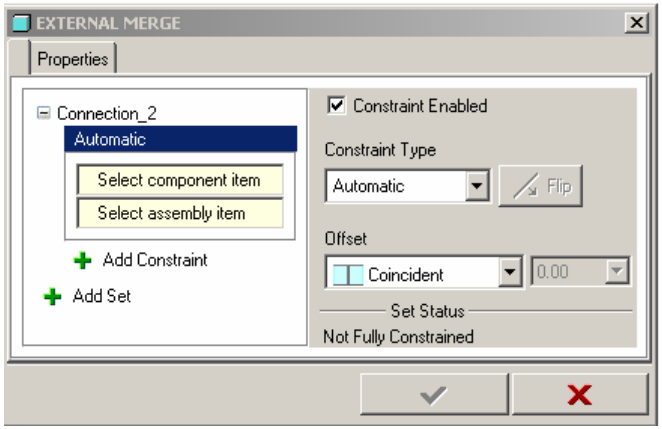




Complete Modernization of GUI for Assembly & Mechanism Design

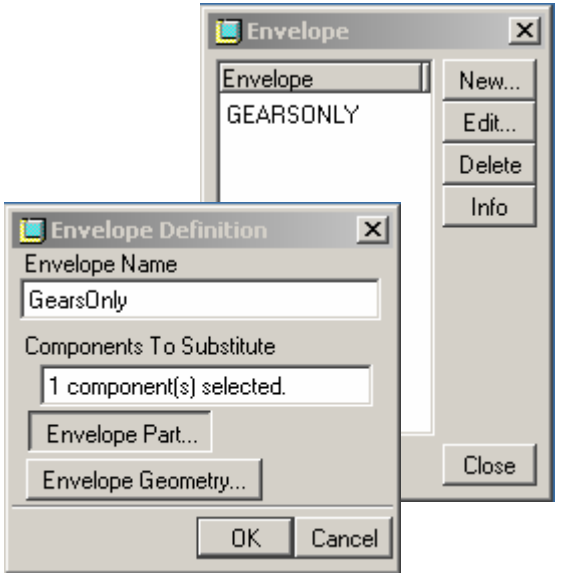
New Data Sharing Feature UI

- Consolidate the Merge, Cutout and Inheritance Feature into a Dashboard
- Allow the user to Redefine Merge & Cutout features to Inheritance Features
- Copy Geometry, Publish Geometry and Shrinkwrap features have been moved to a Dashboard



New Envelope Manager

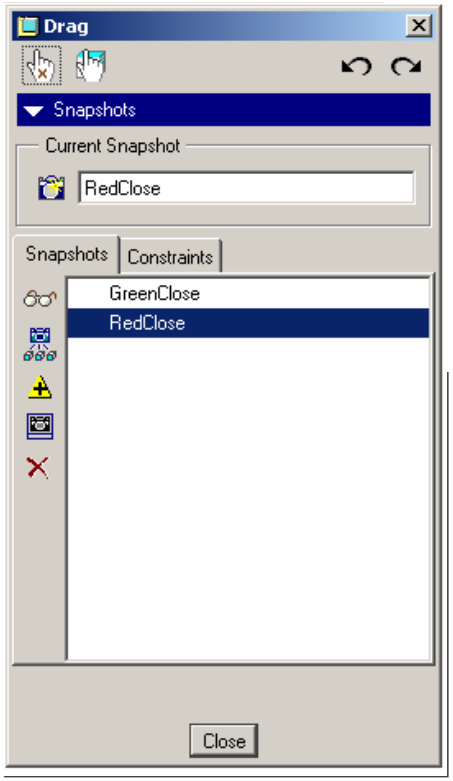
- Easier Access to Envelope Functionality
- Easier creation and maintenance of Envelope parts
- Removal of Menu Manager side menu

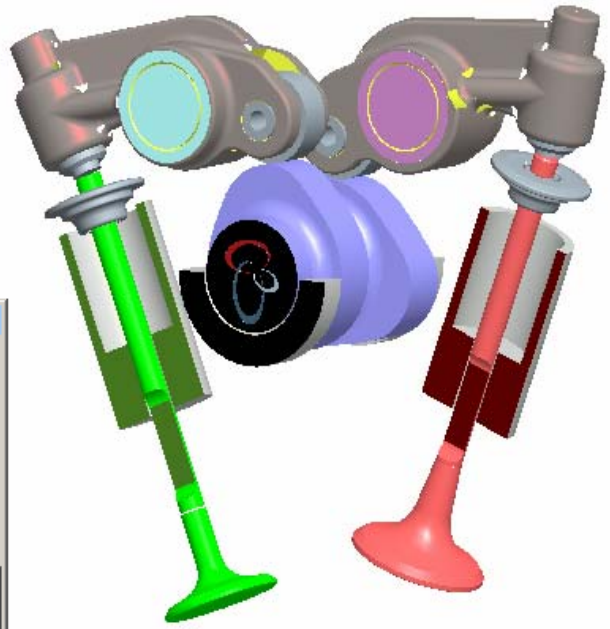


Complete Modernization of GUI for Assembly & Mechanism Design

Mechanism Snapshots Dialog available in Assembly mode

- Create Snapshots directly within Assembly Mode for quick and easy access
- No requirement to enter mechanism mode

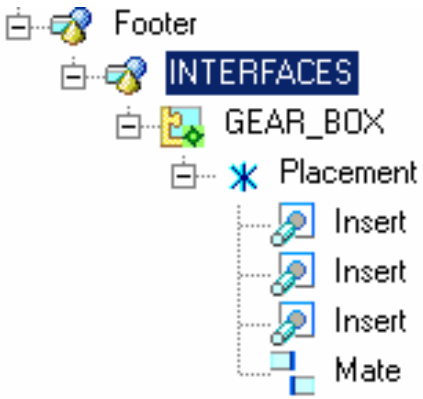




Complete Assembly & Mechanism Design UI Overhaul
Automated Assembly Creation

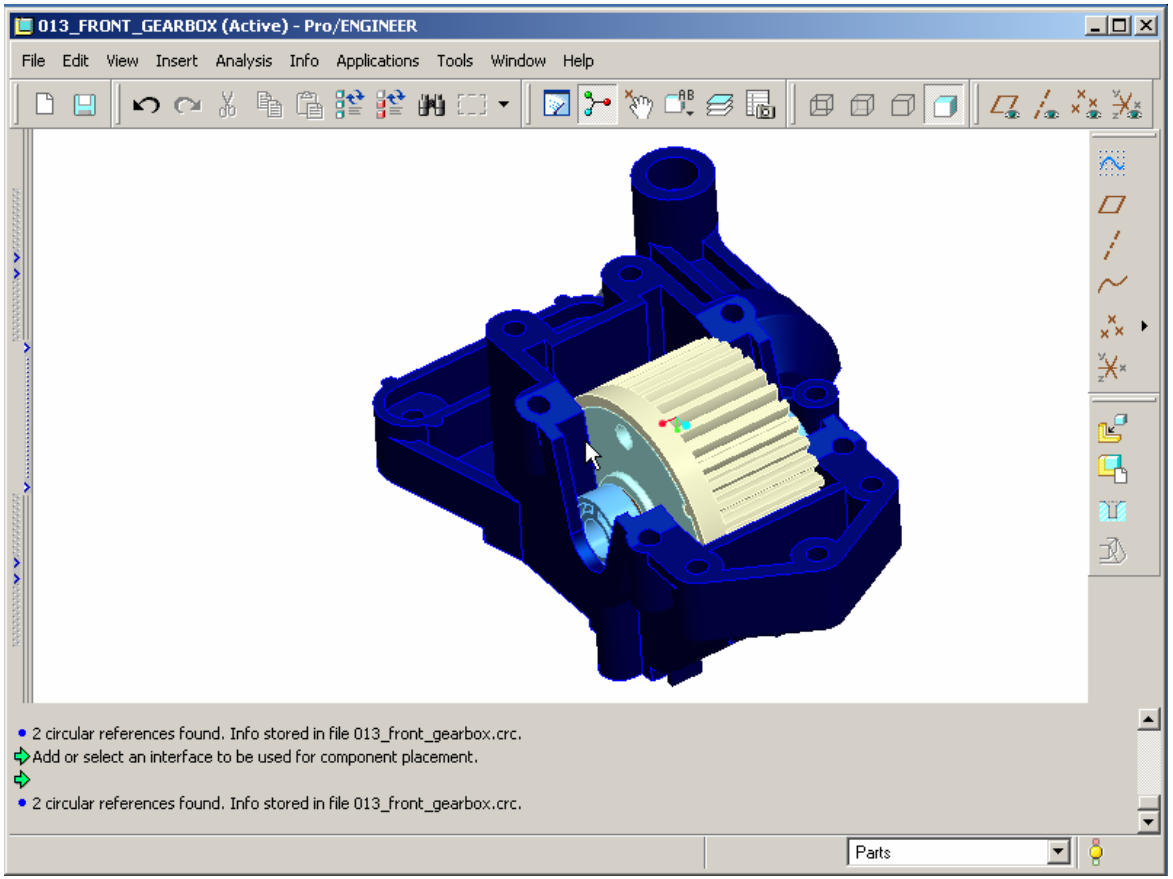
Component Placement Interface locations highlight during placement

Include Interfaces in UDFs!



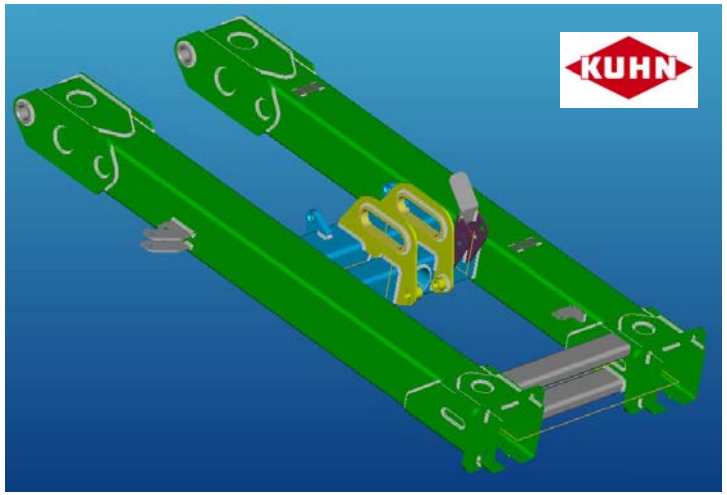
Pro/E 2001:
• 12 Picks

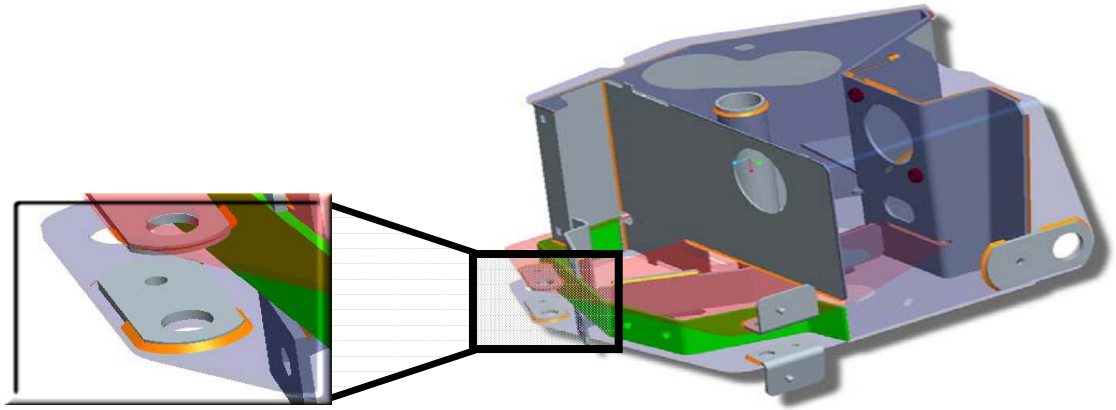
Pro/E Wildfire 3.0:
•1 Pick



Create and Edit Welds Faster!

- 43 Part Weldment Assembly
  - 1400 Weld Features
- ⊙ Regeneration Times
  - 2 minutes with light welds
  - 40 minutes with solid welds



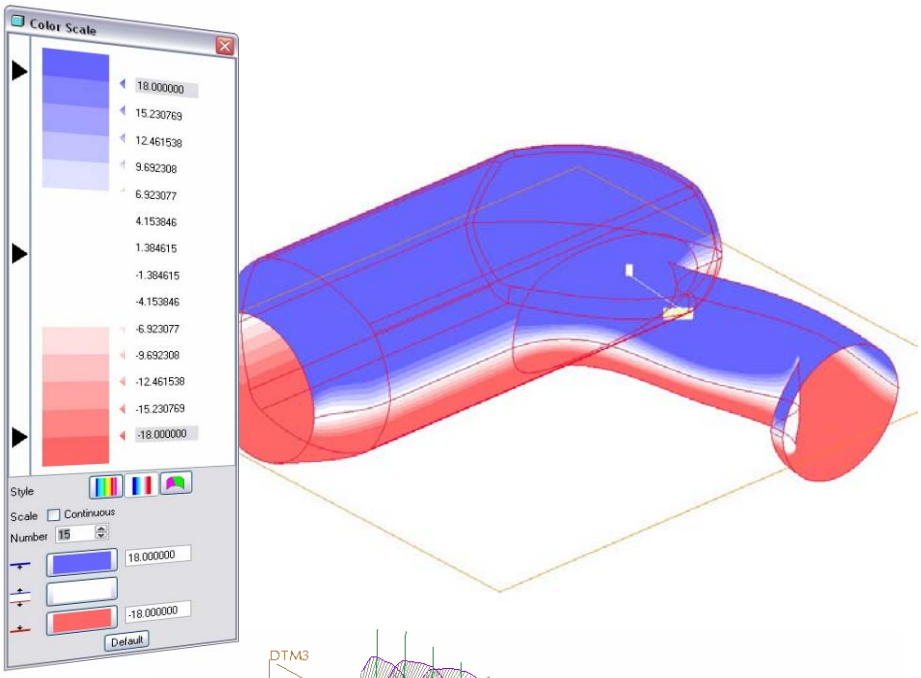


20X Faster Editing & Regeneration

Model Analysis Enhancements

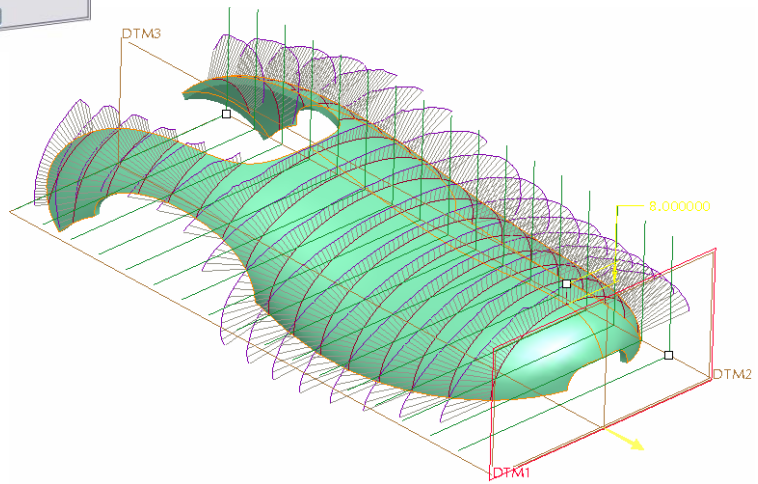
Geometry Analysis

- Enhance color tool for draft analysis
- Add option to define cross sections by ‘span’
- Improve curve offset analysis



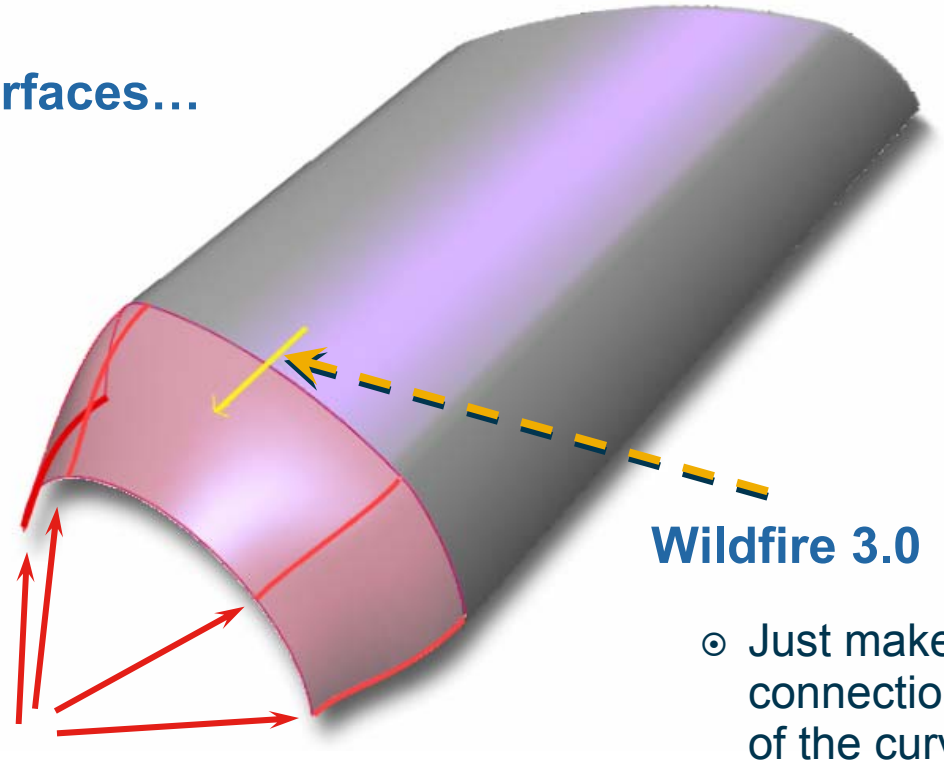
New UI for Measure

- Implement the new workflow and UI that was done for Geometry Analysis in Pro/E Wildfire 2.0



Smart Curve Connections in ISDX

To connect 2 surfaces…



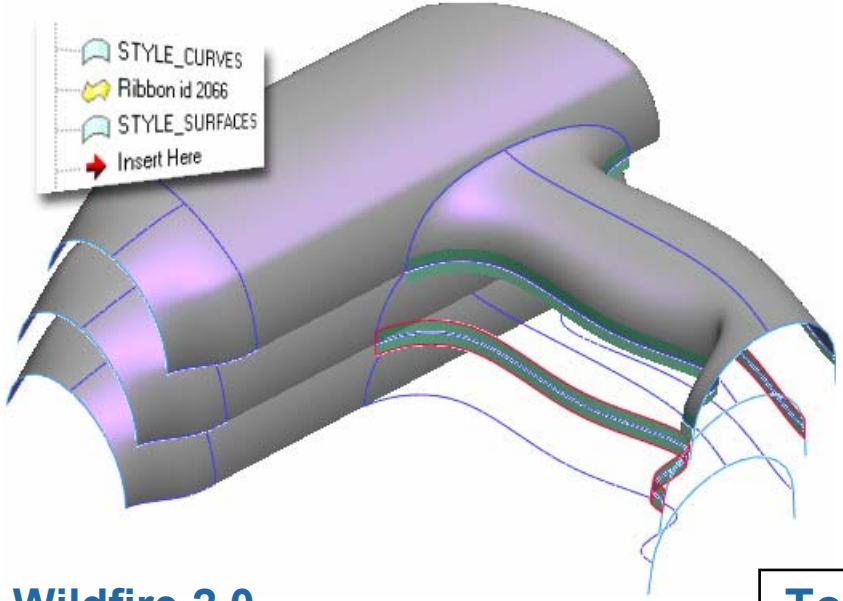
Wildfire 2.0

- Edit *all* cross curves *in turn* to create relevant connection type
- Make surface connection

Wildfire 3.0

- Just make the surface connection – Pro/E does all of the curve editing for you.

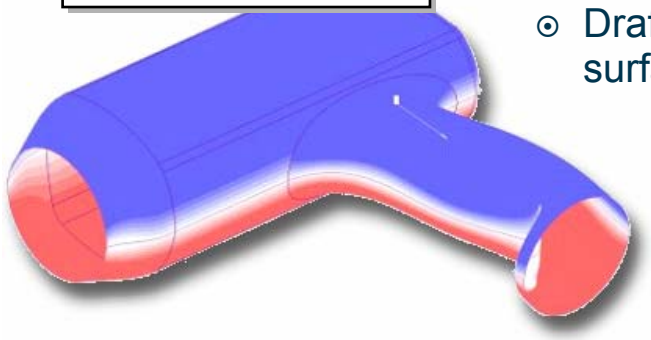
Drafted Surface Connections in ISDX

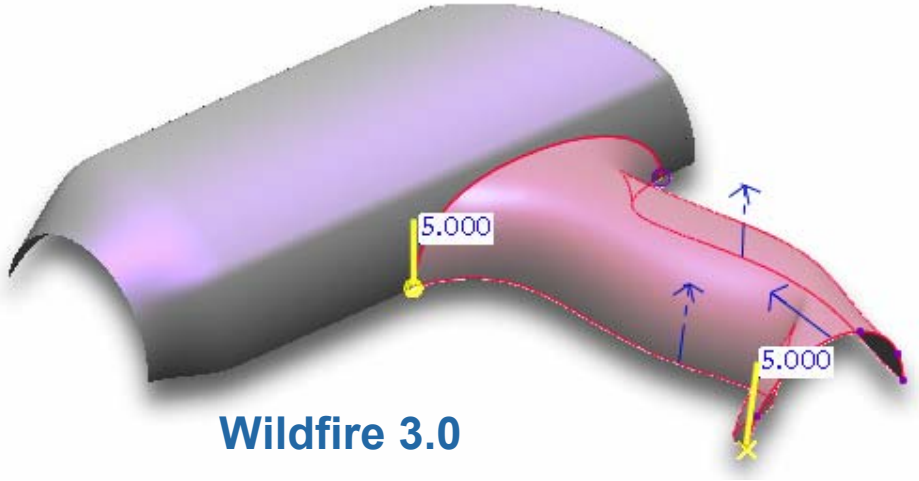


Wildfire 2.0

- 3 separate features
- Curves must precede Datum Ribbon and surfaces must succeed the ribbon
- Dynamic update of surfaces is lost due to their being in a separate feature

To apply draft to a complex surface…

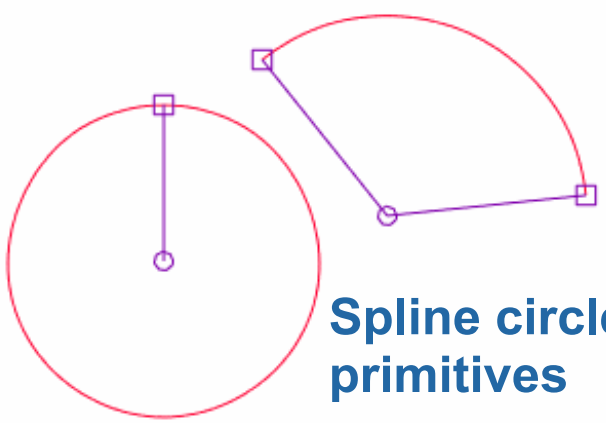




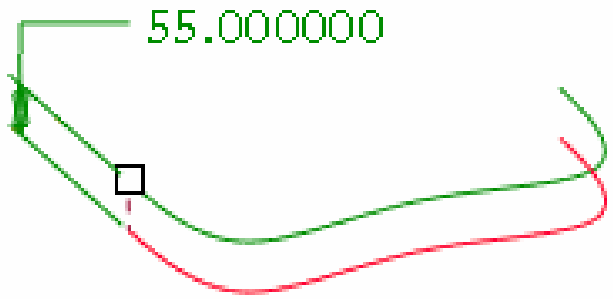
Wildfire 3.0

- Draft connection contained inside a single Style feature
- Fully dynamic updates of curves and surfaces
- Draft to plane or complex surface

New ISDX capabilities in Pro/E Wildfire 3.0

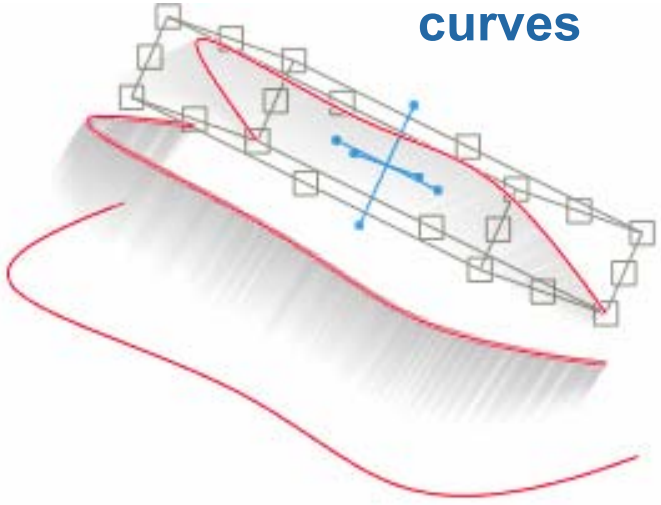


Spline circle/arc primitives

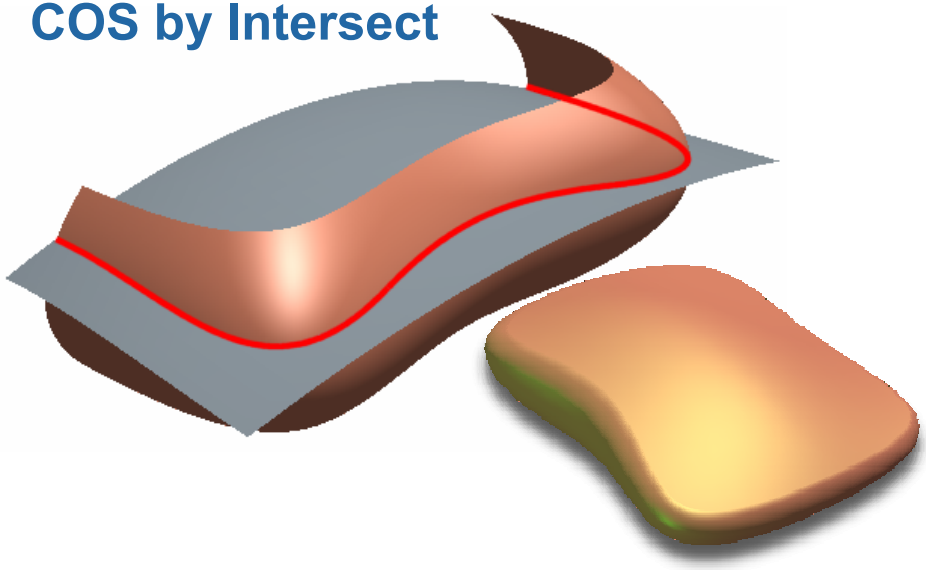


Offset free/planar curve

Rotate/scale curves

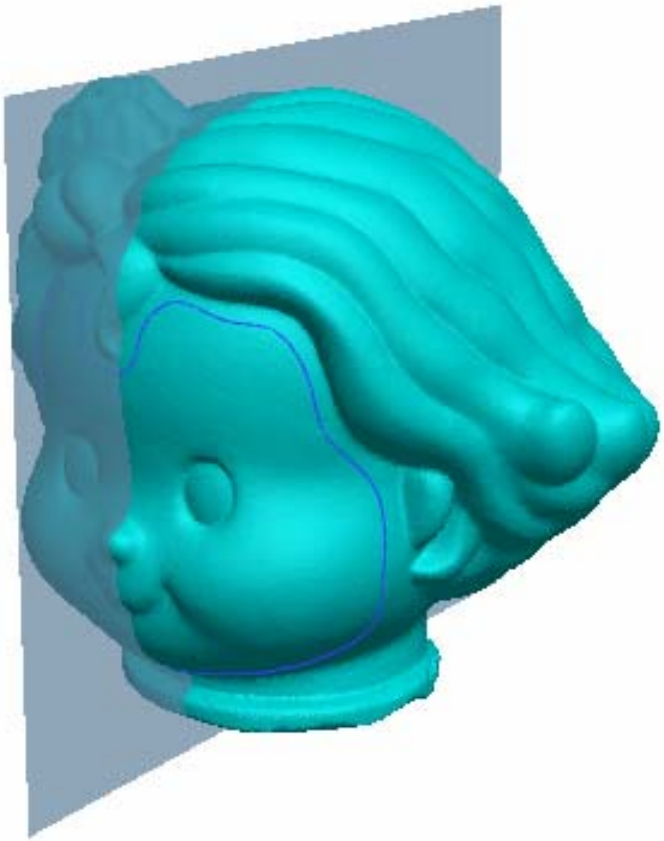


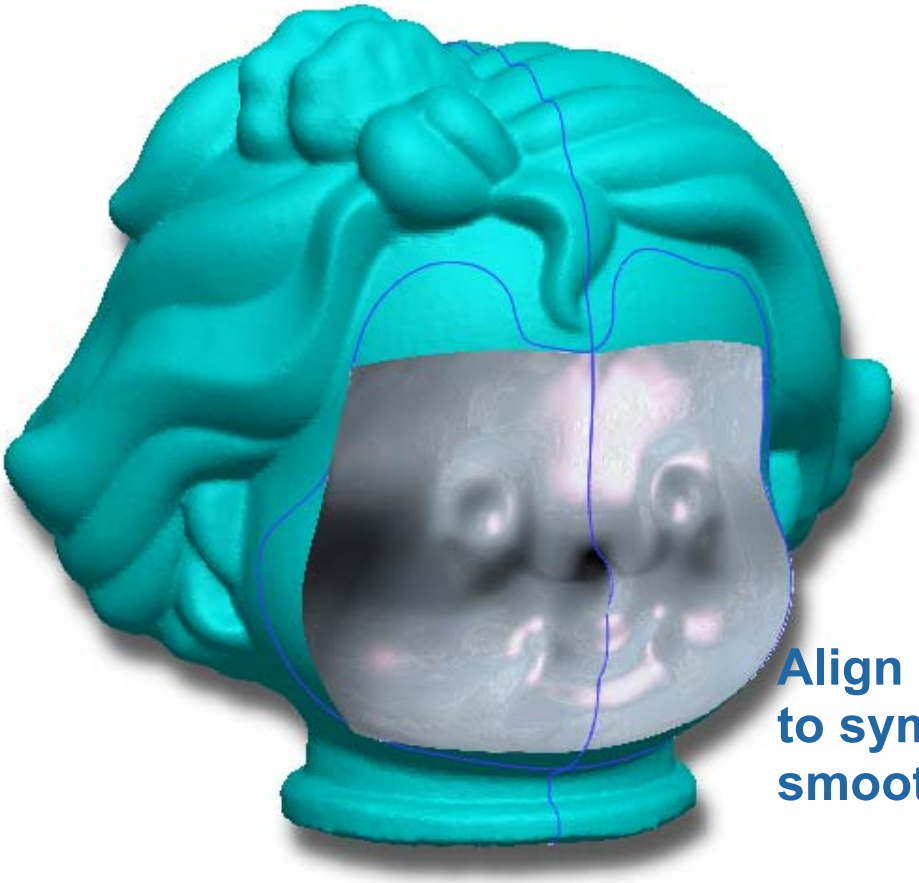
COS by Intersect



New Restyle (REX) capabilities in Pro/E Wildfire 3.0

Find symmetry plane of a point cloud





Align surfaces normal to symmetry plane for smooth mirroring

Modernization of Manufacturing GUI

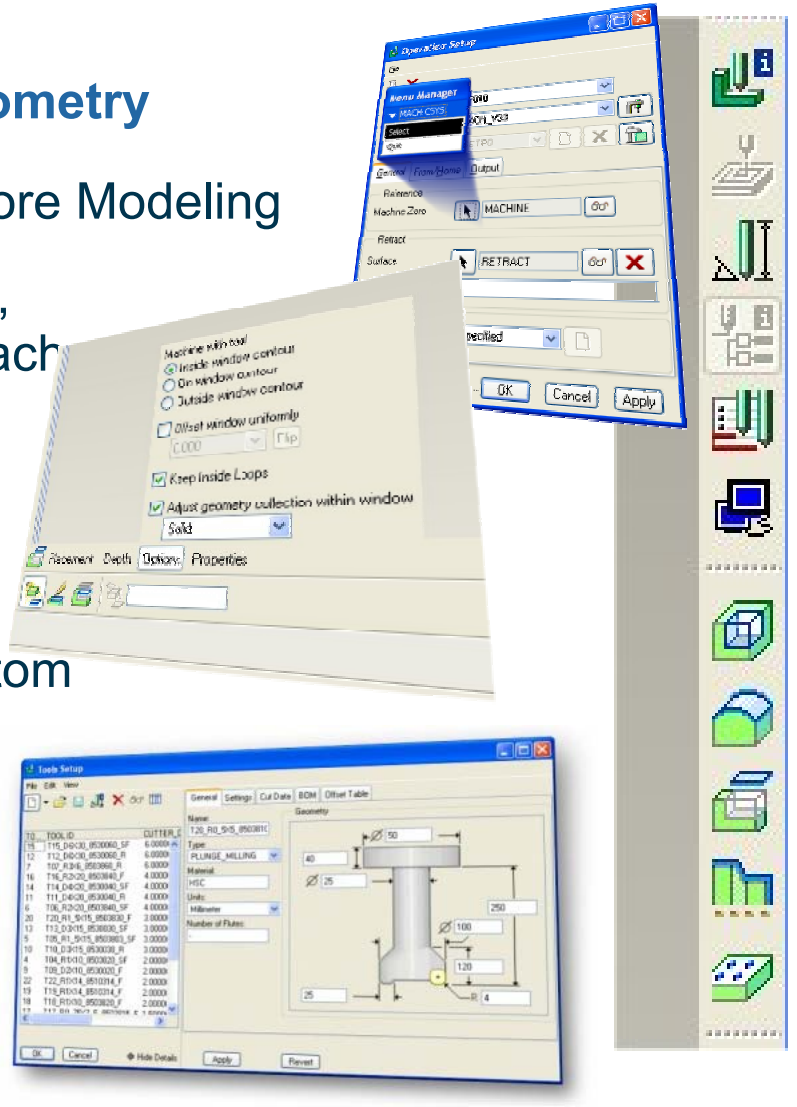
Consistent Manufacturing and Mold geometry

- Datum creation will use same UI as Core Modeling
- Mold and NC geometry with collectors, direct modeling and dashboard approach

Tool Manager UI Overhaul

- Modern, Familiar UI
- Support for Holder, Shank length, custom CL command and custom parameters
- Feed/Speed/Material database managed in PDMLink

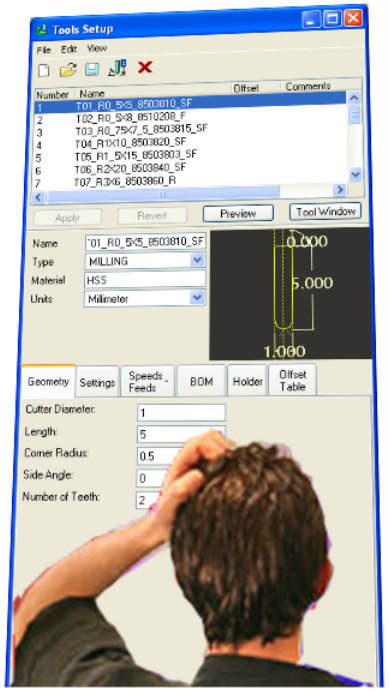
Automatic absolute accuracy setting



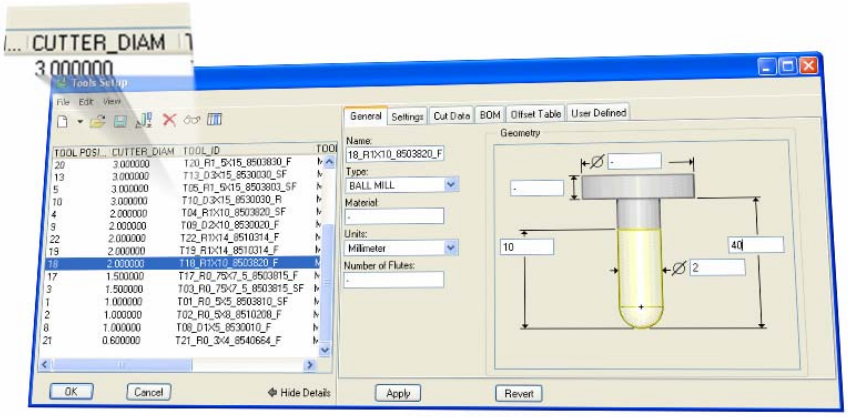
User Productivity – New Tool Manager GUI

Find the right tool in the tool database

- In Wildfire 2.0
  - Remember the name of the pocket number !
  - Scan the list until you find what you want



- In Wildfire 3.0
  - Sort tools using their parameters : for example by cutter diameter
  - A natural way of thinking for the NC programmer … “ I need a 2mm ball end mill ….”



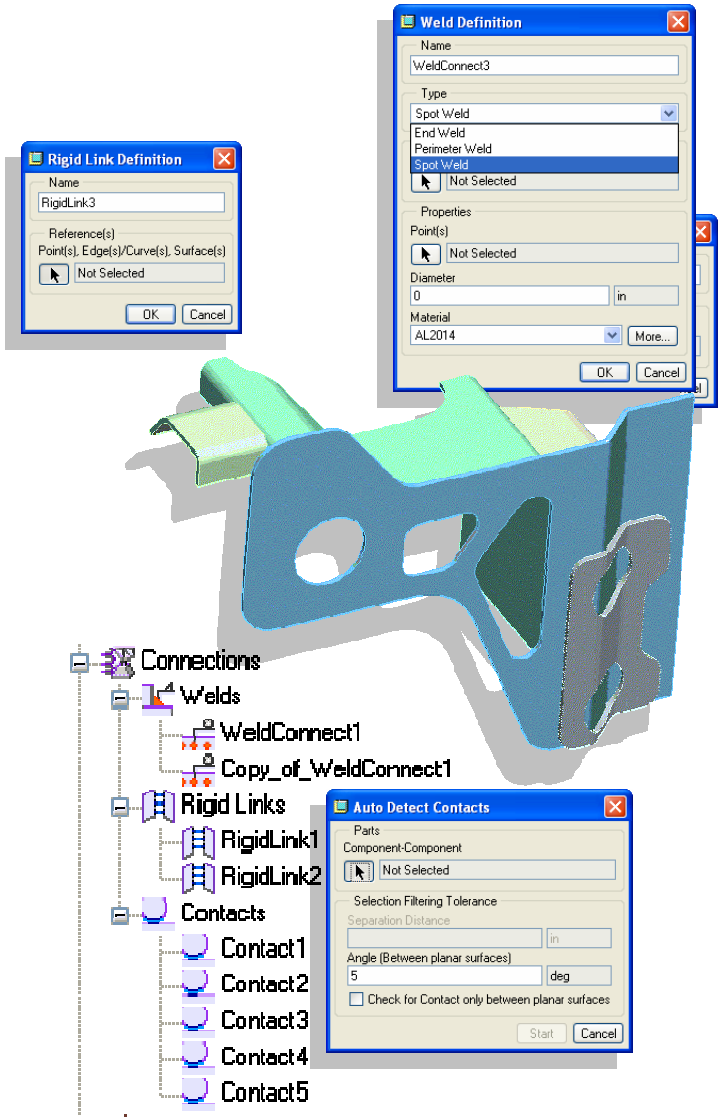
Structural and Thermal Usability Improvements

Remaining “Mechanica” objects merged into Pro/E

- Including...
  - Spot welds
  - Rigid connections
  - Contact regions
- Enhanced capabilities include…
  - Improved UI
  - Object-Action interaction (direct editing)
  - Layers support
  - Model tree support
  - Improved display and controls
  - Much, much more...

Automatic Contact Definition

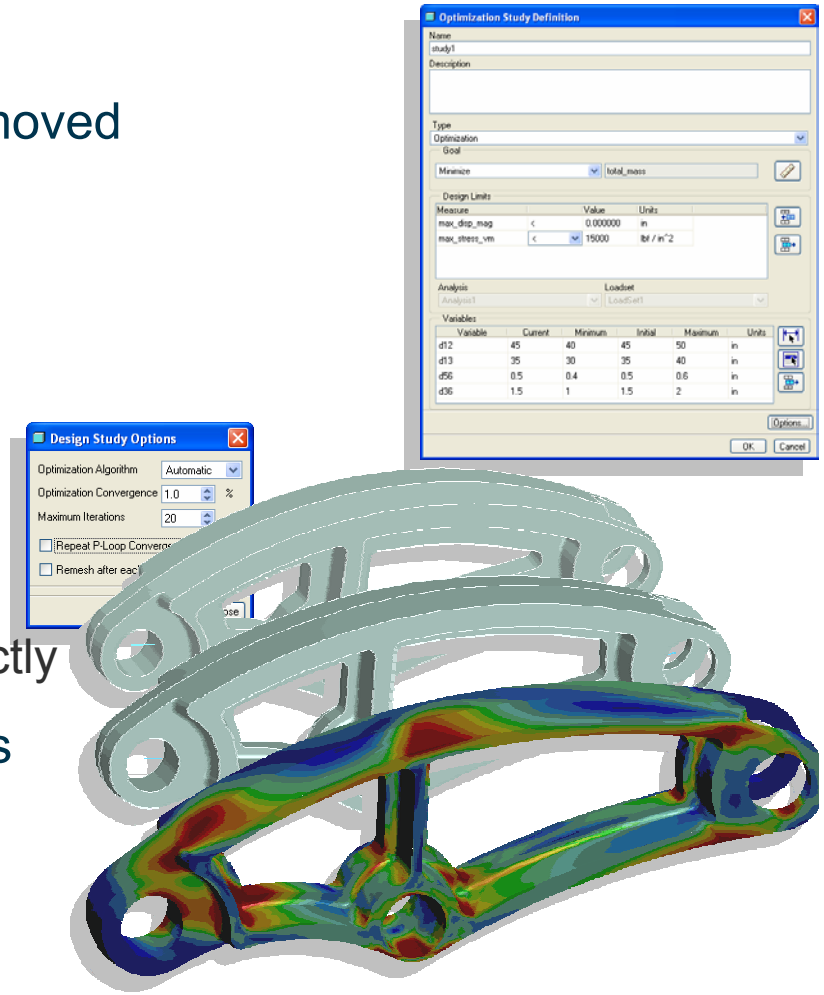
- Select components and separation
- Contacts are automatically created



Structural and Thermal Usability Improvements

New design study UI

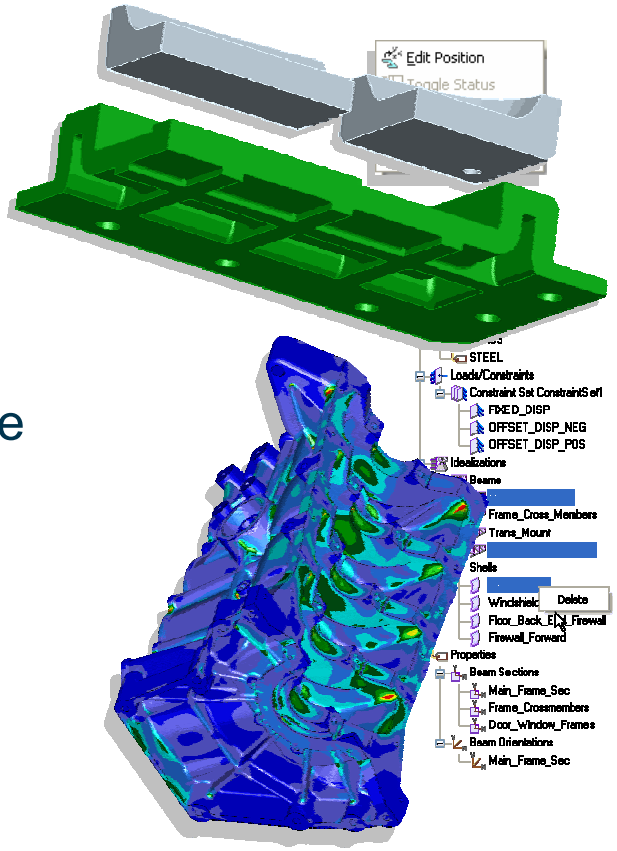
- The last of the “Old Style” UI to be removed
- Usability improvements to...
  - Optimization definition
  - Sensitivity study definition
  - Design Studies
- No more design variable definition
  - Use dimensions and parameters directly
- Greater control of optimization settings
- Feasibility studies added



Structural and Thermal Usability Improvements

Many smaller improvements....

- Selection/Copy enhancements
  - Copy and Paste of simulation modeling objects
  - Multi-selection for delete
- Hide/Unhide for simulation objects in model tree
- Exploded views supported in modeling
  - Contact definition is much simpler
  - Define connections in exploded state
- Results improvements
  - Dynamic query labels don't erase when spinning model
  - Spin center control allows rotations about a user selected location
  - Legend settings don't reset when window is edited



Improved ECAD Interface

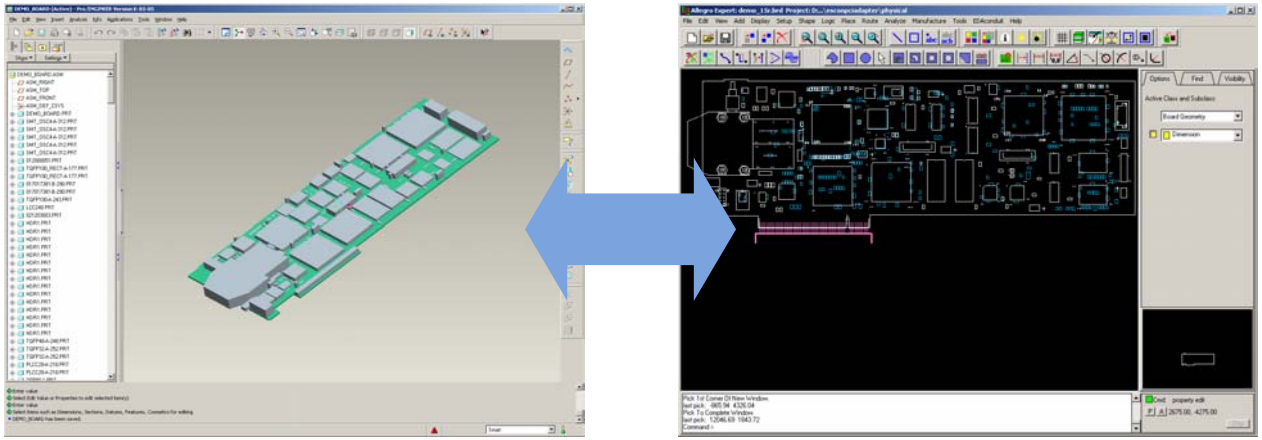
Improved ECAD Import User Interface

Improved ECAD Export User Interface

Improved "ECAD Areas" User Interface

Bi-directional ECAD updating project is underway now.

- Will support Mentor Graphics, Cadence and Zuken.
- Likely going to be available to select customers for evaluation and feedback in Pro/E Wildfire 3.0



Pro/ENGINEER Wildfire 3.0
Powerful

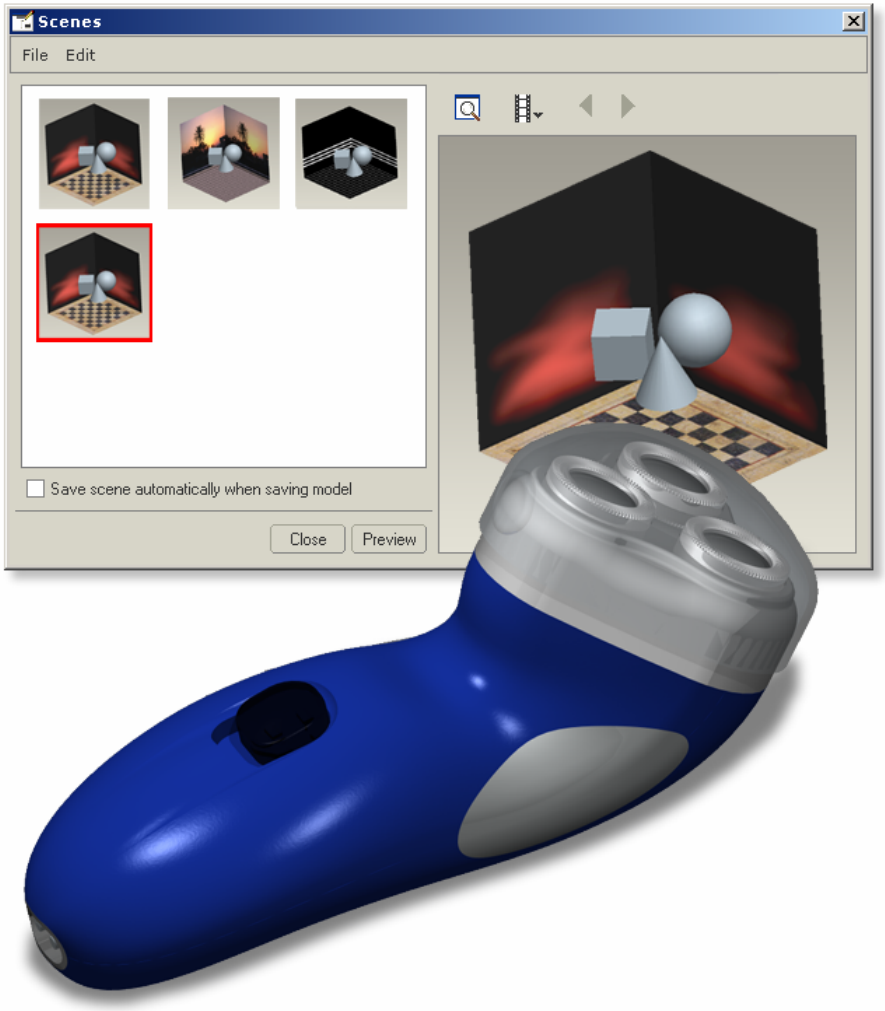
Complete Coverage and Depth of Discrete Manufacturing Process

PTC®
The Product Development Company™

Rendering Enhancements

Scenes

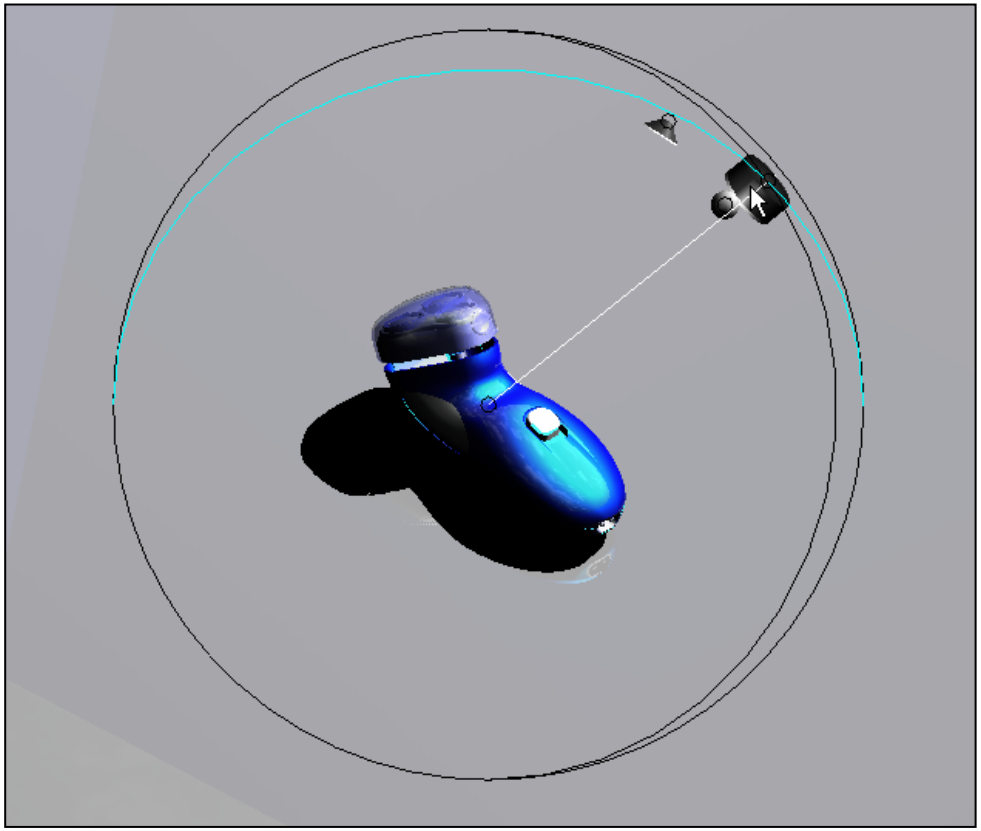
- Save Lights, Room and Render Settings as a file or with the model
- Use Scene Palette to manage and create new scenes
- Room / Lights automatically scale base on model size on retrieval
- Easily retrieve, tweak and render



Rendering Enhancements

Direct manipulation of lights within Pro/ENGINEER

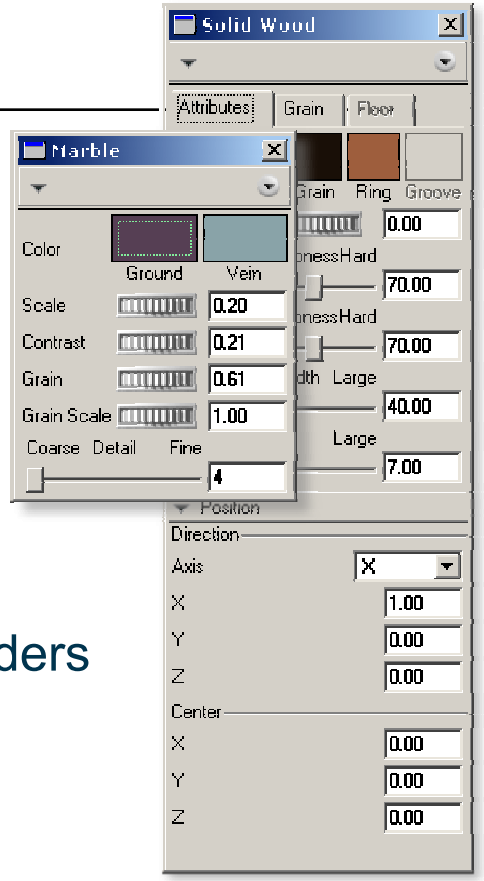
- Simply drag different parts of the Light to adjust position, angle and focus
- Sphere provides precise control in 3D space
- Color of light is represented in the light icon



Rendering Enhancements

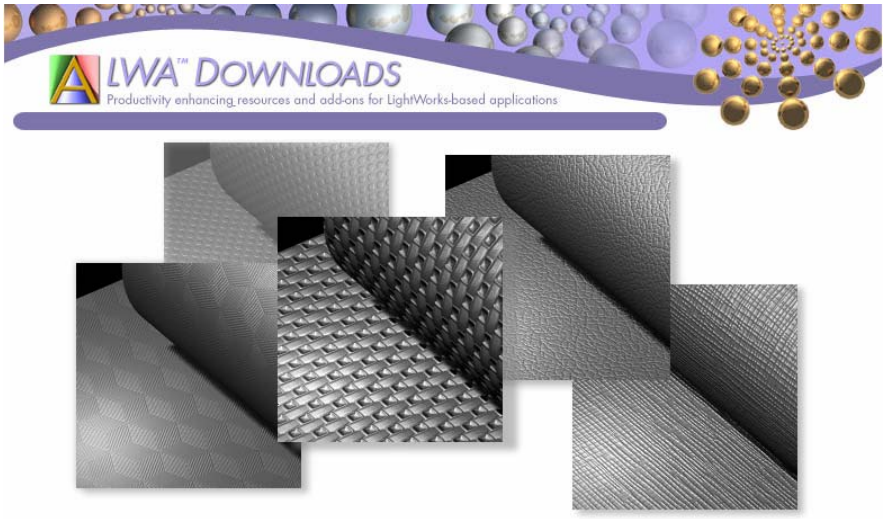
Edit Photolux Materials

- New UI allowing users to edit Photolux shader parameters



Lightworks Material Archive Support

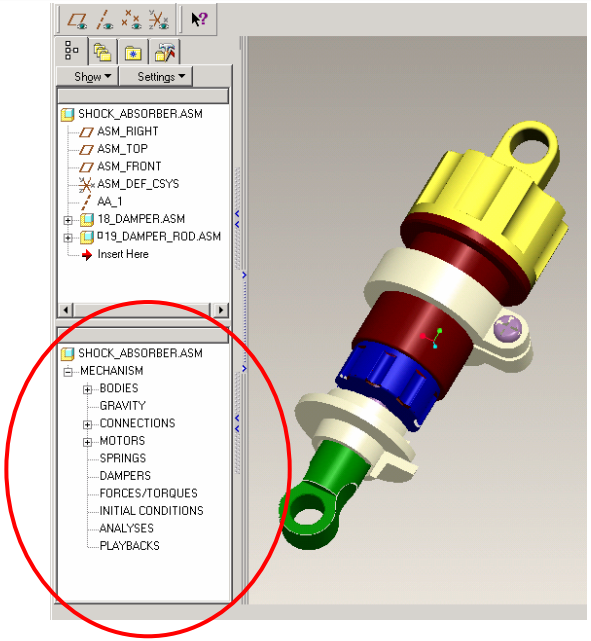
- Free and purchased download of LWA shaders



More Powerful, Faster Assembly & Mechanism Design

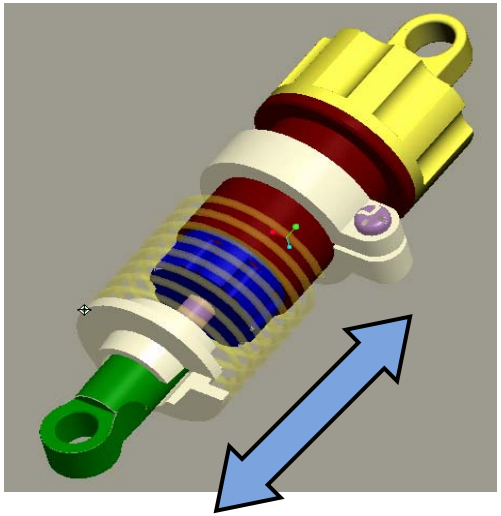
Split Model Tree

- In Assembly mode, view mechanism bodies in lower pane
- In Mechanism mode, view the mechanism entities in lower pane



Support for Flexible Components in Kinematic Assemblies

- Mechanisms will not be locked by flexible components during drag operations

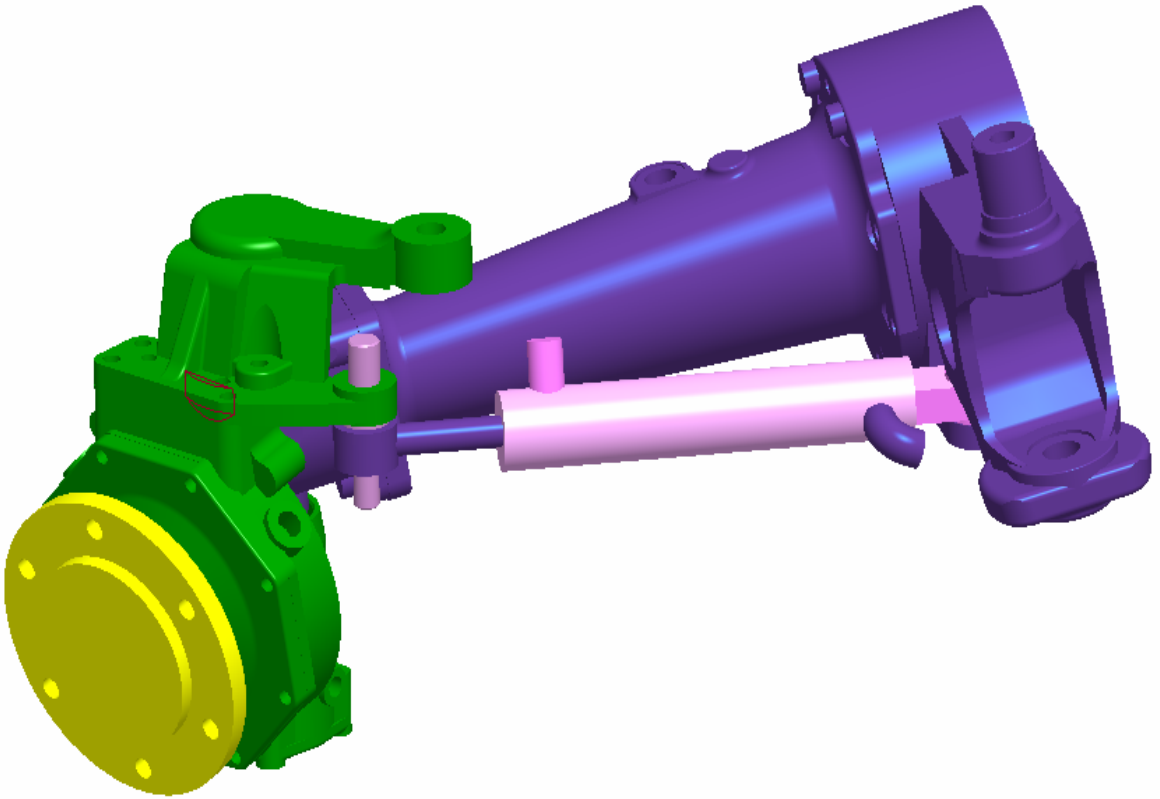


Real-time Collision Detection

Real-time collision detection in Assembly mode

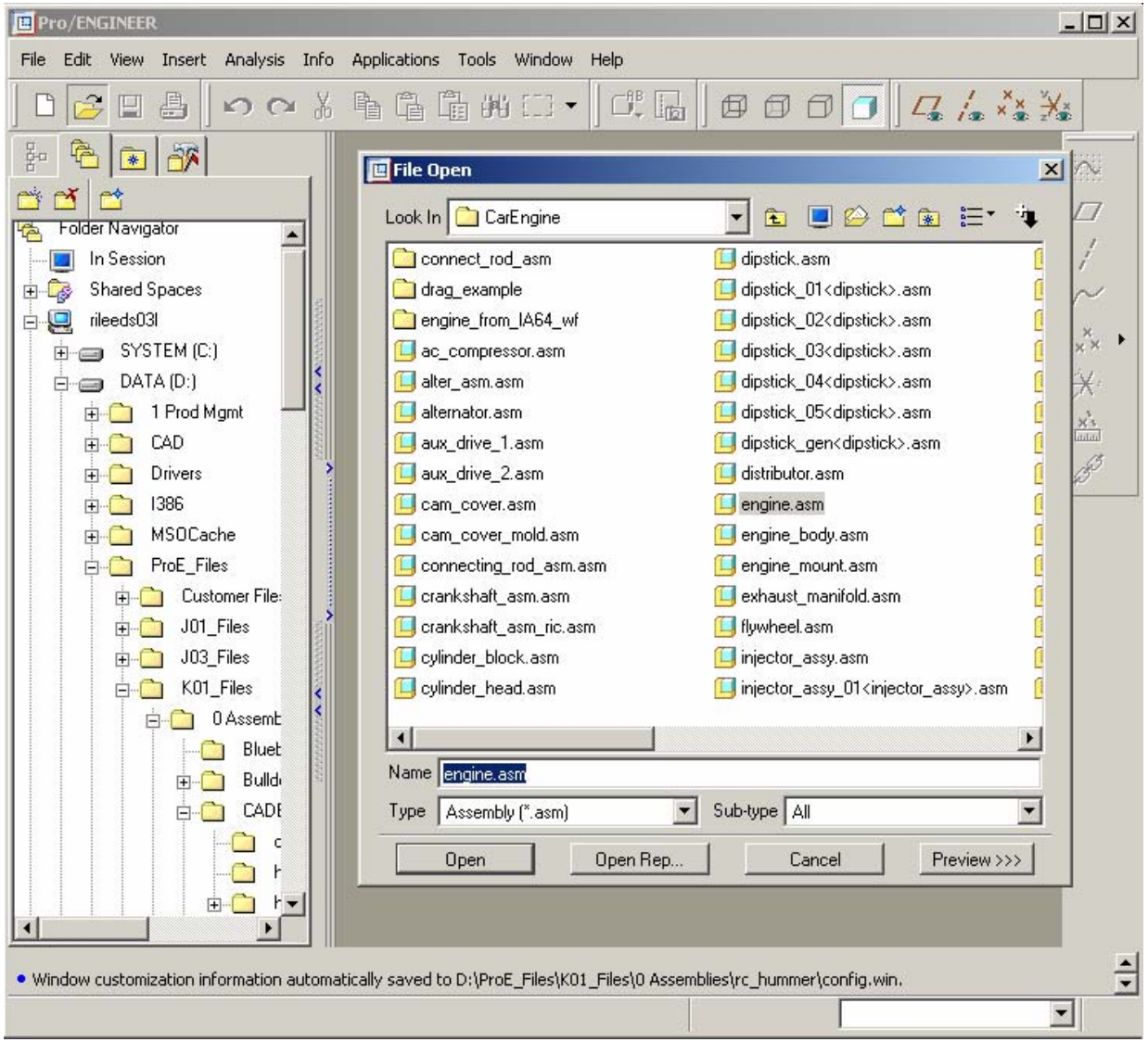
No Mechanism Analysis Setup Required

- Interference Highlighting
- Stop on Collision
- Push on Collide



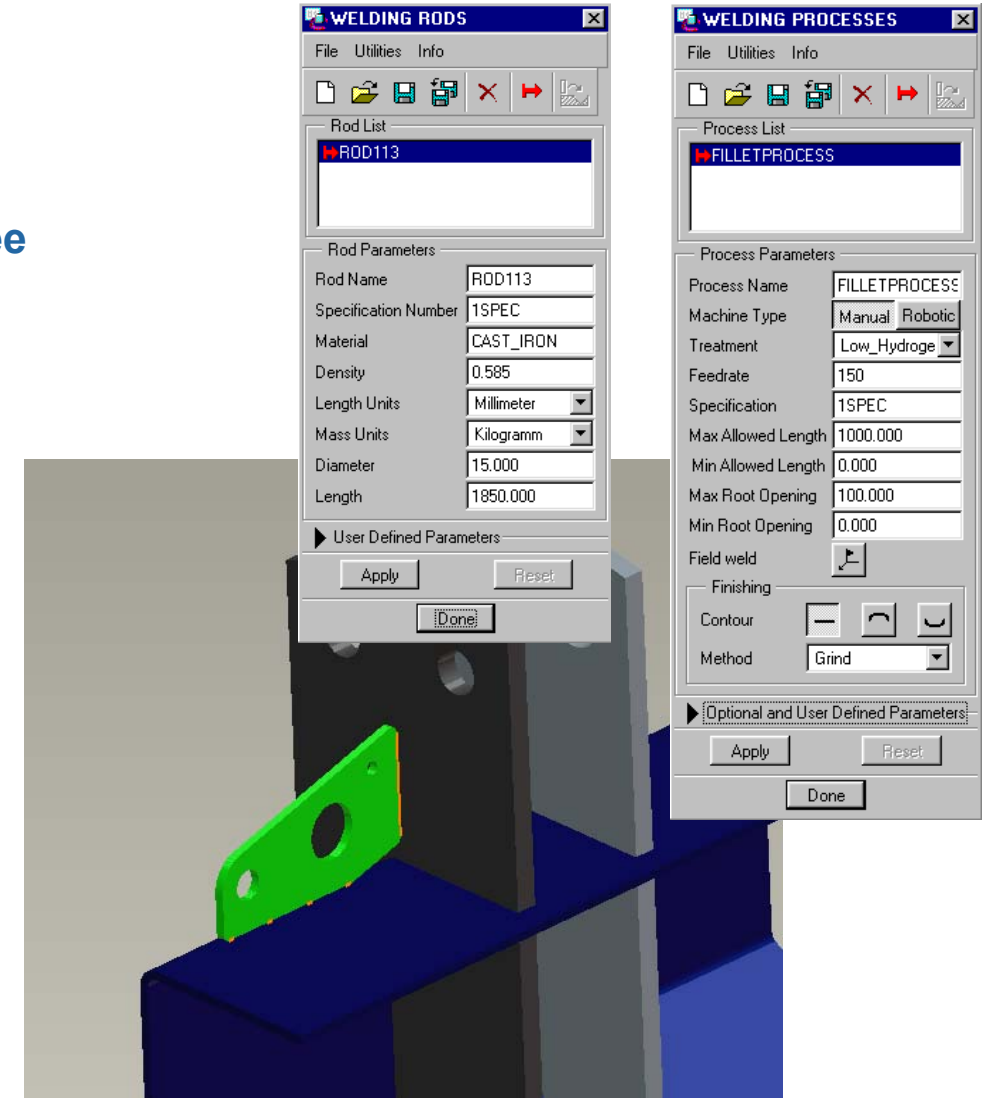
Multi Threaded Assembly Retrieval

Start visualizing an assembly immediately during retrieval



More Flexible Capture of Welding Information

- **Light Welds (LW) & Edge Prep features**
- **LW are now visible in standard 3D mode, and accessible via the Model Tree**
- **LW Display Thickness**
- **Edge – Surface Fillet Welds**
- **Curve and Edge selection during LW creation**
- **New 2D Cross Section symbol for LW**
- **Intermittent Groove LW**
- **Specify LW hidden color for Plotting**



2D Drawing Improvements

Place Shaded views in drawings

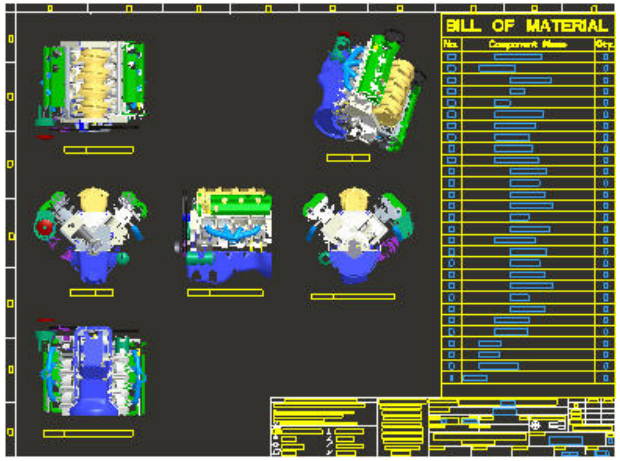
Plotting shaded views and embedded objects (.jpg labels, for example)

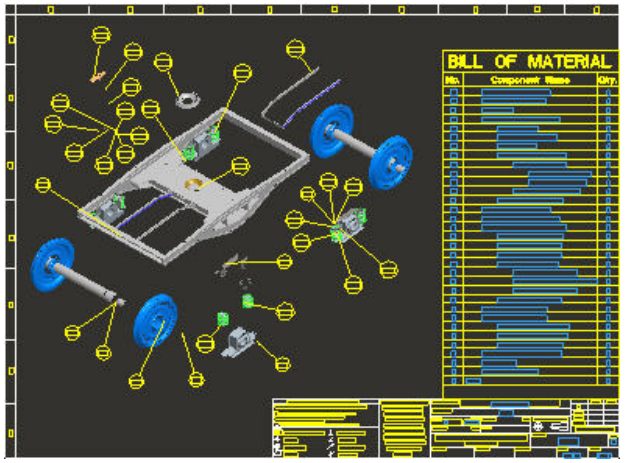
Drawing template updates

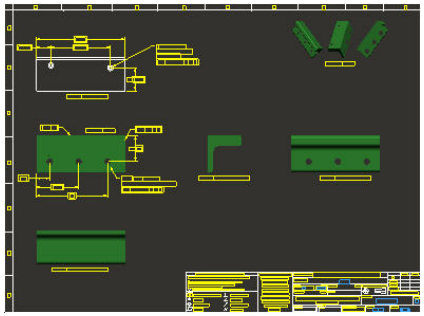
Automatic clipped dimensions

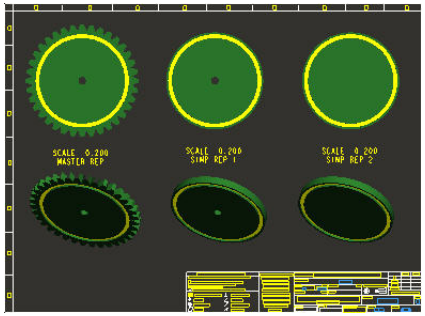
One-sided, double dimensions

Part Simplified Reps in Drawings





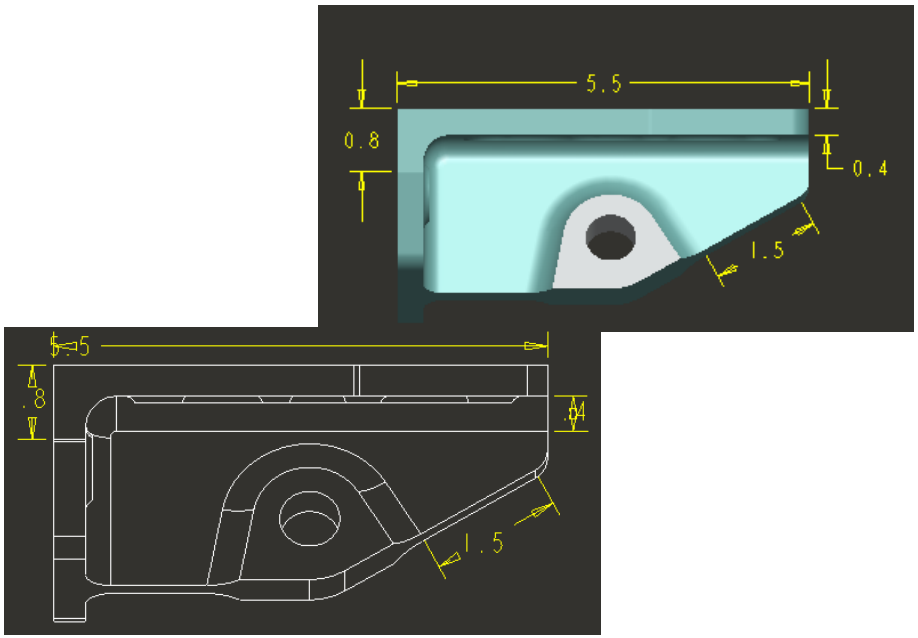




2D & 3D Drawing Improvements

2D Drawings

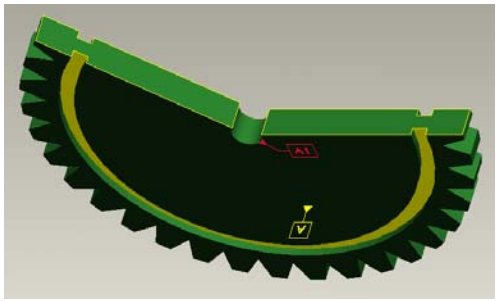
- Automatically place dimension text
- Export Drawings tables as CSV file
- Angular and Ordinate dimension improvements

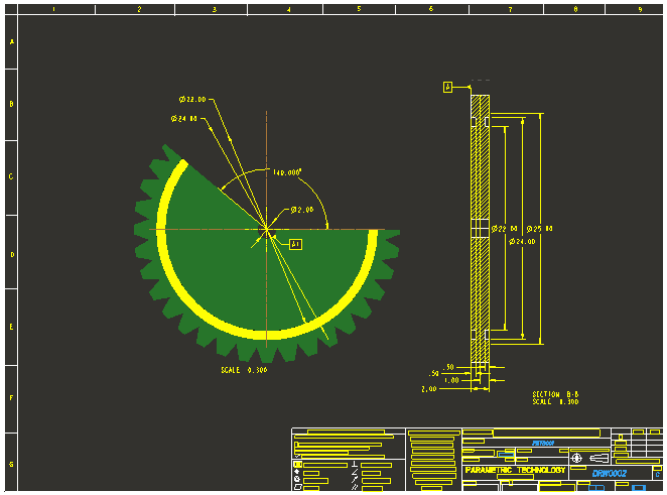


3D Drawings – Annotation Features

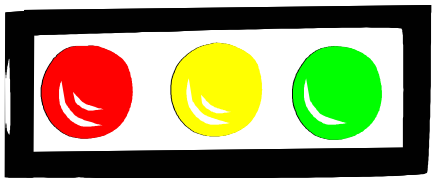
- Set Datums on Surfaces
- Profile GTOL
- Annotation Features in UDFs
- Define “up” for Annotations
- Formalized method for display of offset sections and cutting planes

Automatically create 2D Drawings based off of 3D Drawings



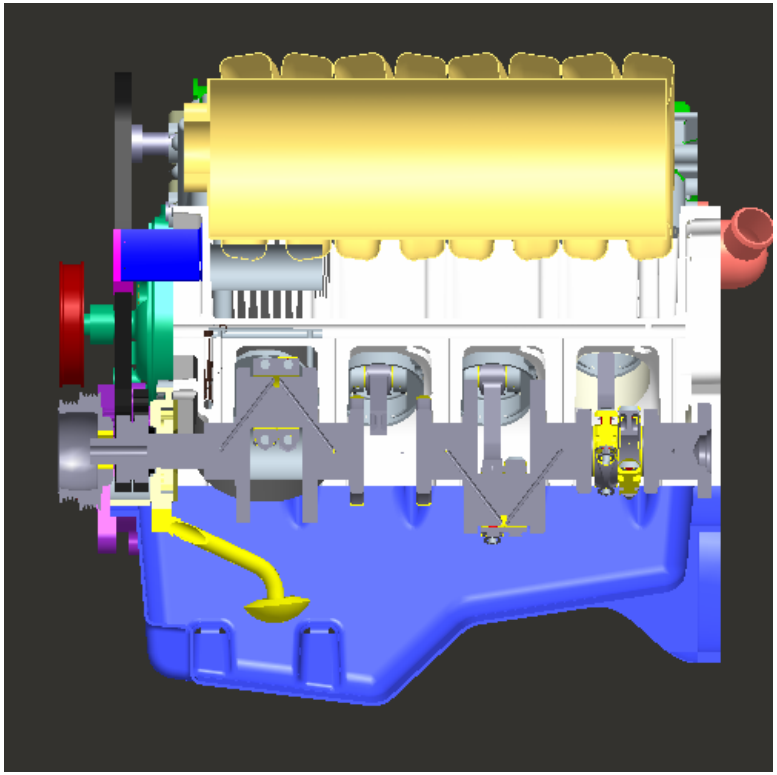


Most things are better in color…



So are Pro/ENGINEER Drawings!

- Communicate critical design information using full color drawing views!



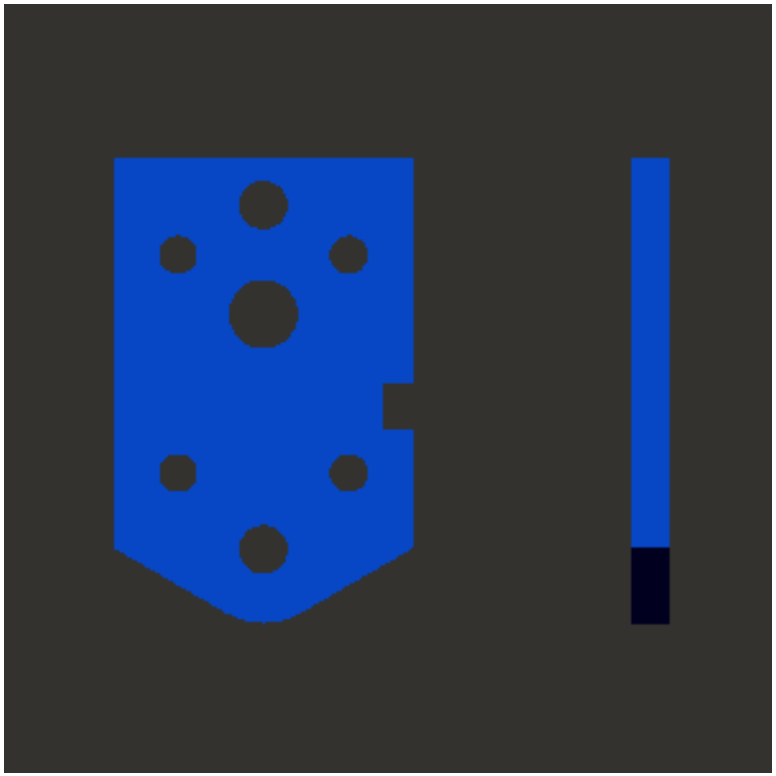
Benefits

- Improved design interpretation
- Enhanced visibility

Create Dimensions in less than half the time

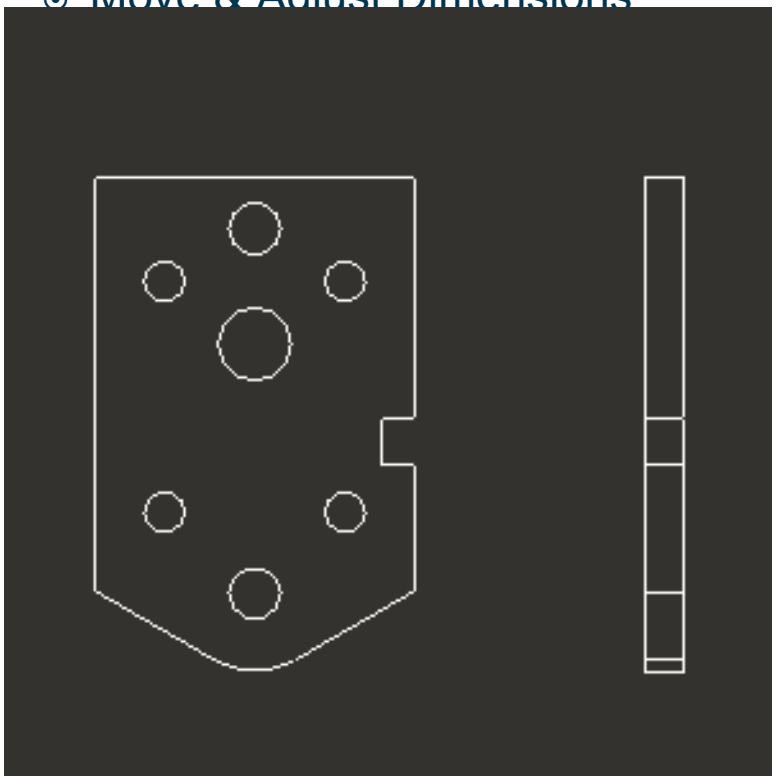
WF 3.0 – 19 seconds!

- Create Dimensions



WF 2.0 – 50 seconds

- Create Dimensions
- Move & Adjust Dimensions



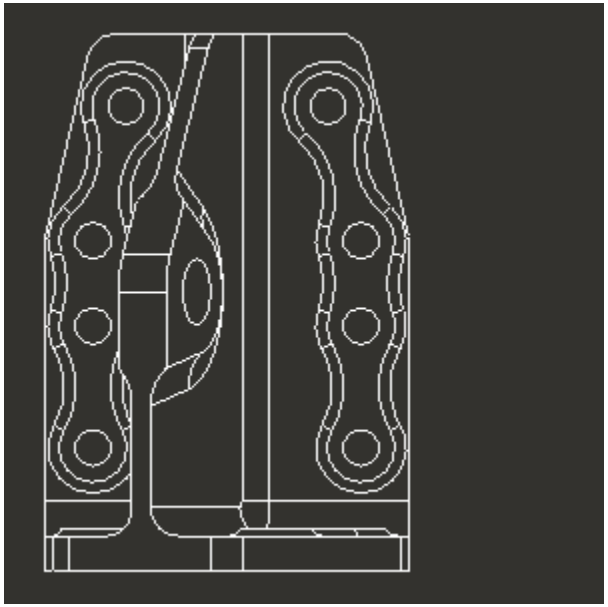
Create Ordinate Dimensions – almost twice as fast!

WF 3.0 – 37 seconds!

- Create Ordinate Dimensions
- Edit Attachment

WF 2.0 – 62 seconds

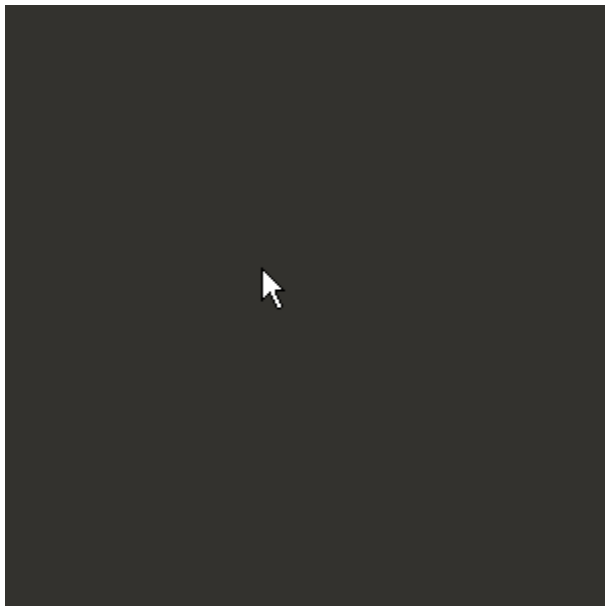
- Create Linear Dimensions
- Toggle to Ordinate Dimensions
- Toggle to Linear Dimension
- Edit Attachment
- Toggle to Ordinate AGAIN!



Re-Create Model Views in Drawings – More than twice as fast!

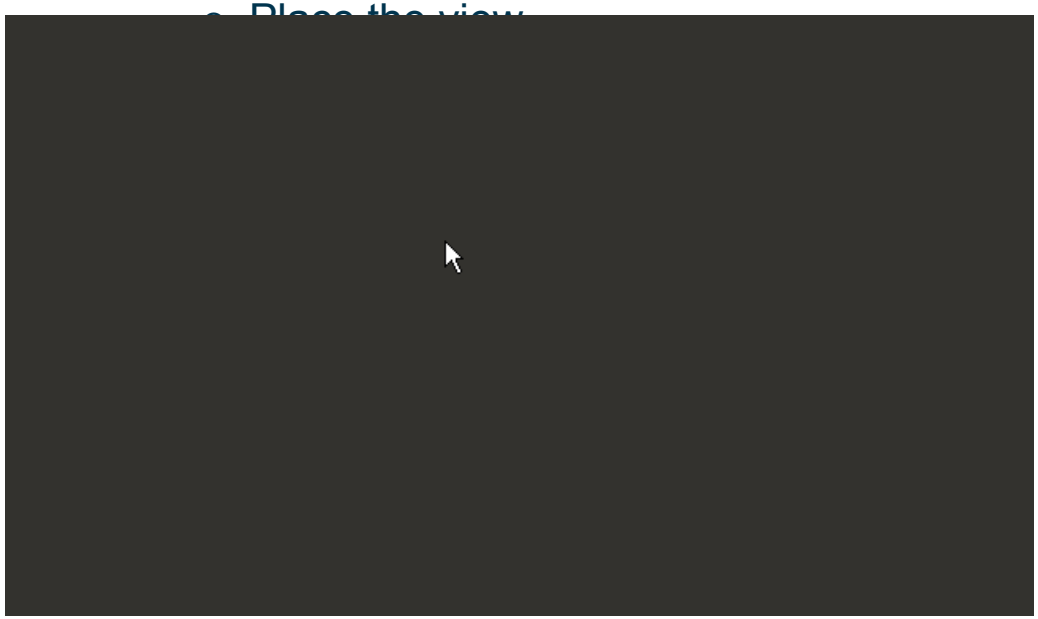
WF 3.0 – 7 seconds!

- Create a drawing view
- Select a Presentation State
- Place the view



WF 2.0 – 19 seconds

- Create a drawing view
- Navigate through the view tabs
  - Select Orientation
  - Select Cross Section
  - Select Explode State
- Place the view



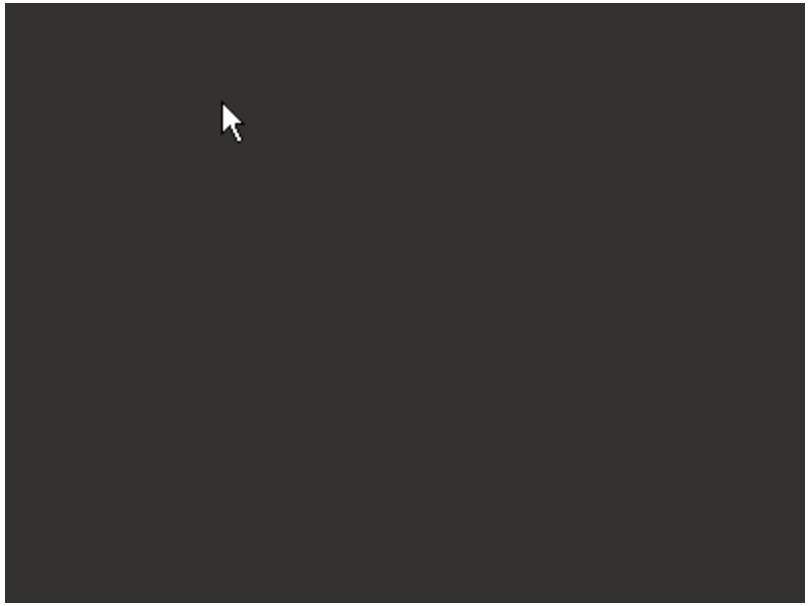
Show 3D Annotations – More than twice as fast!

WF 3.0 – 45 seconds!

- Create a drawing view
- Clean up annotations

WF 2.0 – 99 seconds

- Create a drawing view
- Show annotations by view
- Clean up (and erase unwanted) annotations



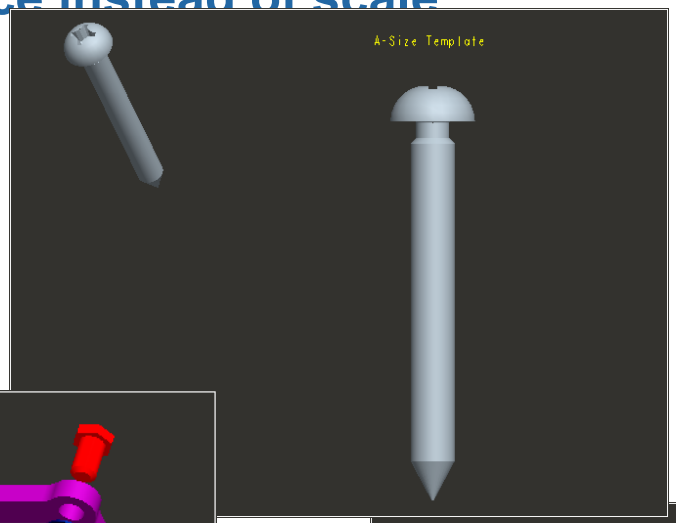
Faster, Re-Usable Drawing Templates

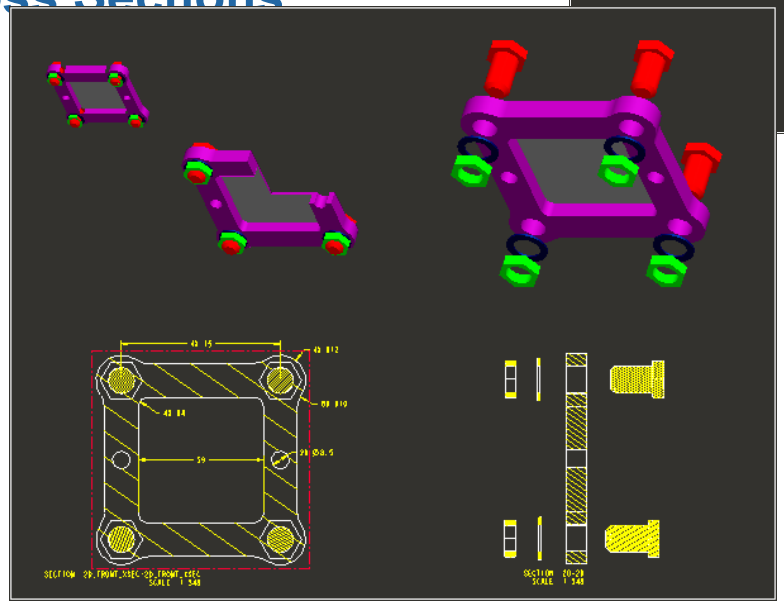
Define views using paper space instead of scale

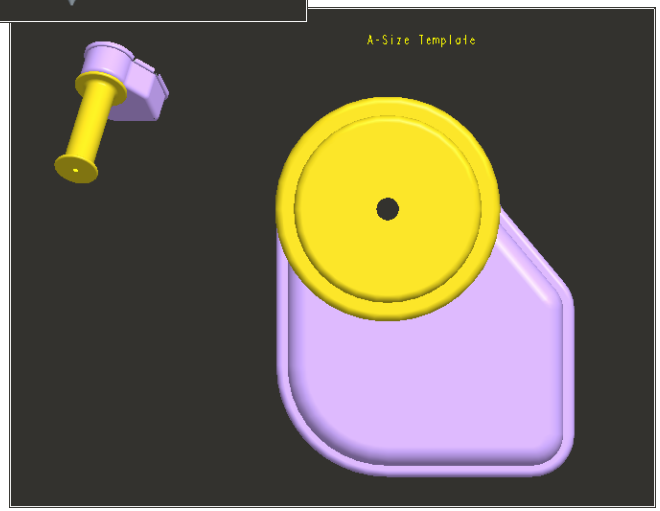
Re-Use 3D Model Views

Auto Show Annotations

3D Cross Sections



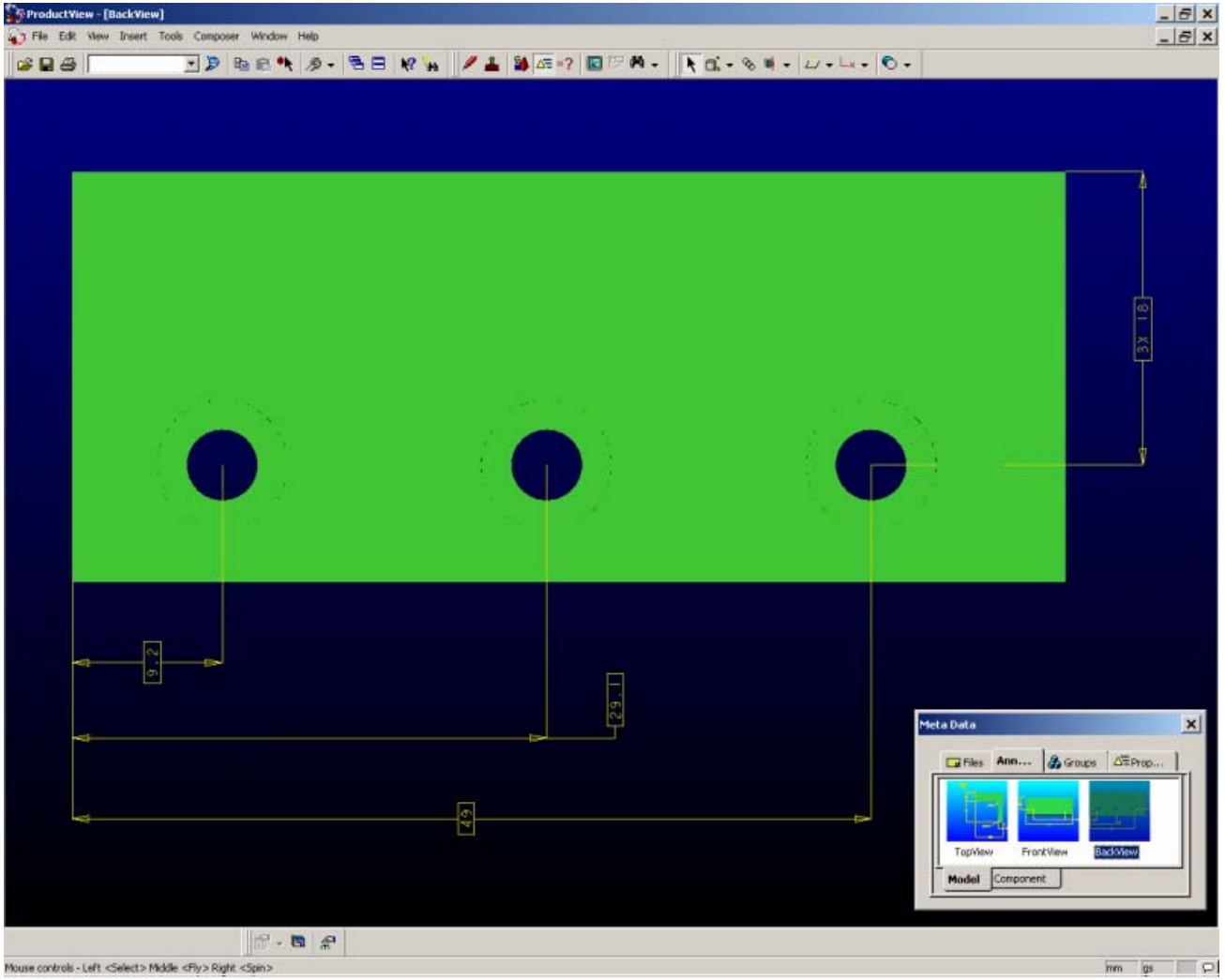




Visualize 3D Drawings in ProductView (Available in Rel. 8.0)

Create packaged views for consumption by manufacturing

- Single click to view GD&T and viewpoint
- Hide unnecessary detail and retain critical dimensions
- Improve user understanding



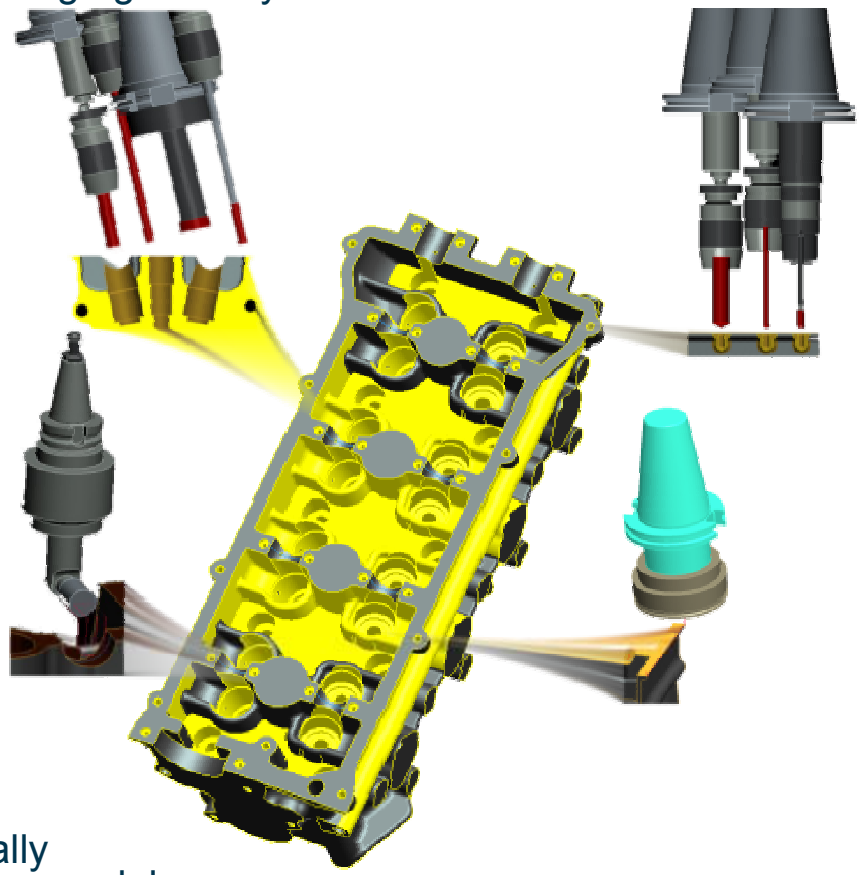
3D Drawings and Annotation Features Beyond Text and Symbols

In addition to text and symbols, Manufacturing Process information can now be captured as part of the 3D design model.

- Instead of calling out the properties of design geometry, the actual process for building that geometry can be associated with the 3D design geometry itself

Significant automation downstream, in developing Manufacturing Strategies

However, in order to be effective, this new approach will require a shift in typical PDP activities:



1.) Manufacturing Engineer

- Creates standard design features, and associates validated manufacturing processes

2.) Design Engineer

- Creates design models, using standard features, which have associated process

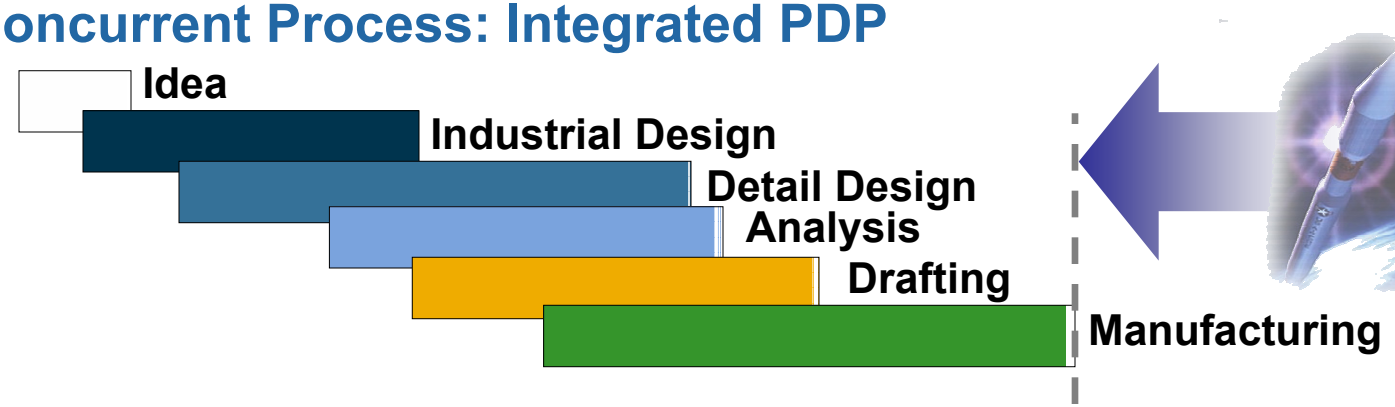
3.) Manufacturing Engineer

- Creates manufacturing process, by automatically extracting embedded processes from the design model

Product Development Process (PDP) Evolution

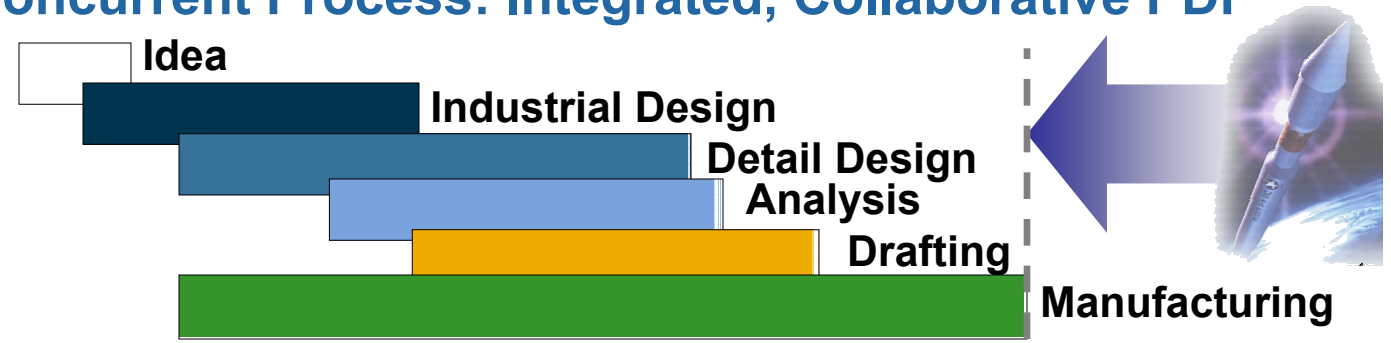
Traditional, Sequential Process: Fragmented PDP

Concurrent Process: Integrated PDP



Compressed Product Development Time

Concurrent Process: Integrated, Collaborative PDP

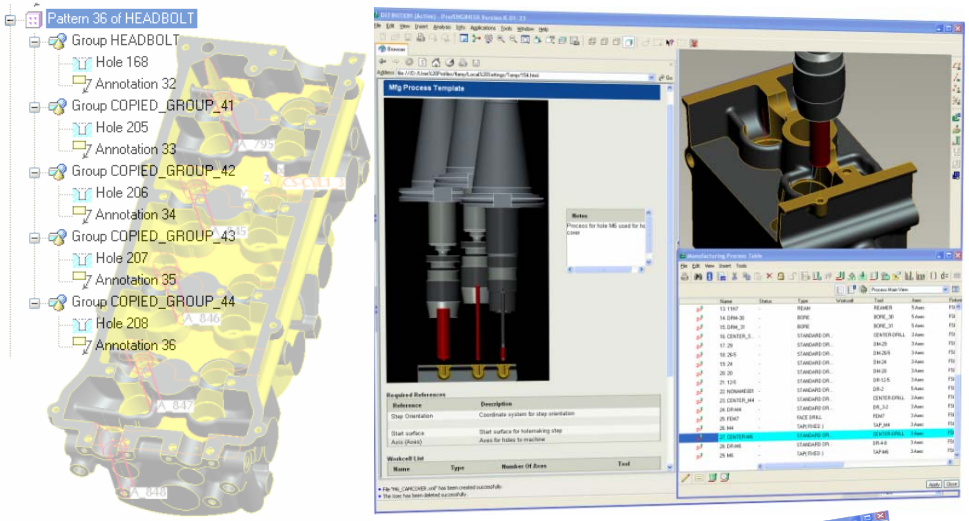


Further Compressed Product Development Time

Manufacturing Process Management using 3D Drawings

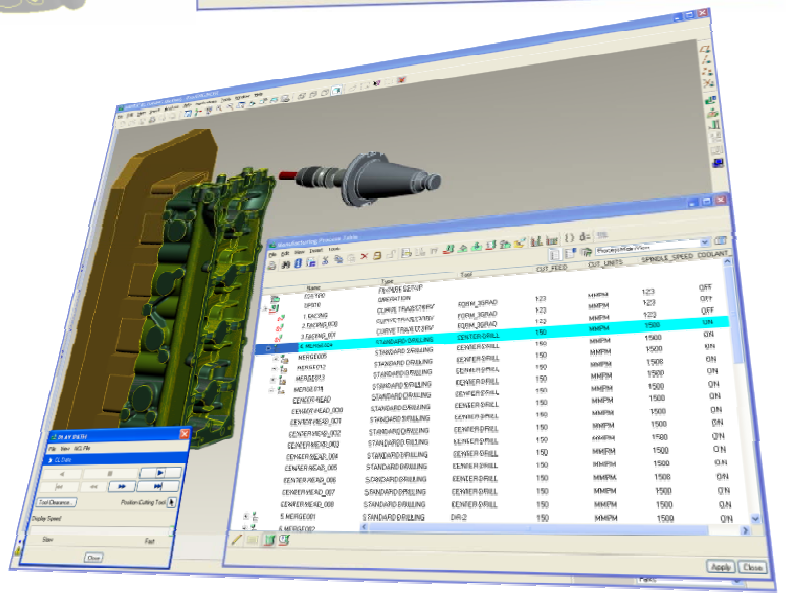
Design for Manufacturing with "Manufacturing Annotation Feature"

- Attach proven manufacturing process (XML template) to geometry
- Combine geometry and manufacturing processes



Automatically extract manufacturing processes from 3D Model

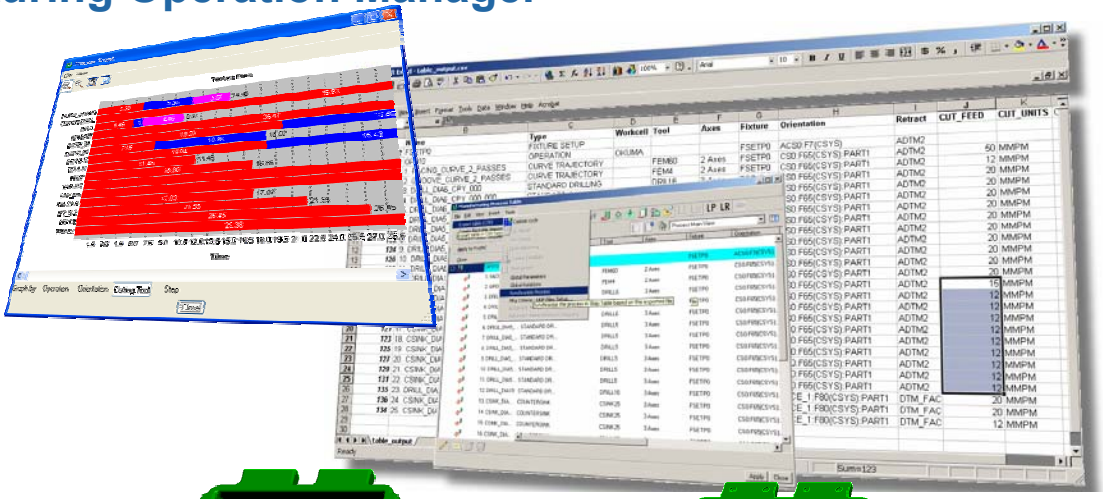
- In the Manufacturing Operation Manager
- Based on Manufacturing Annotation Features
- Automatic step creations
  - Rules based sorting and ordering
  - Automatic (user customizable) grouping of "similar" toolpaths
  - Mimic existing processes (process template)



Manufacturing Process Automation through Design

Optimize the process in Manufacturing Operation Manager

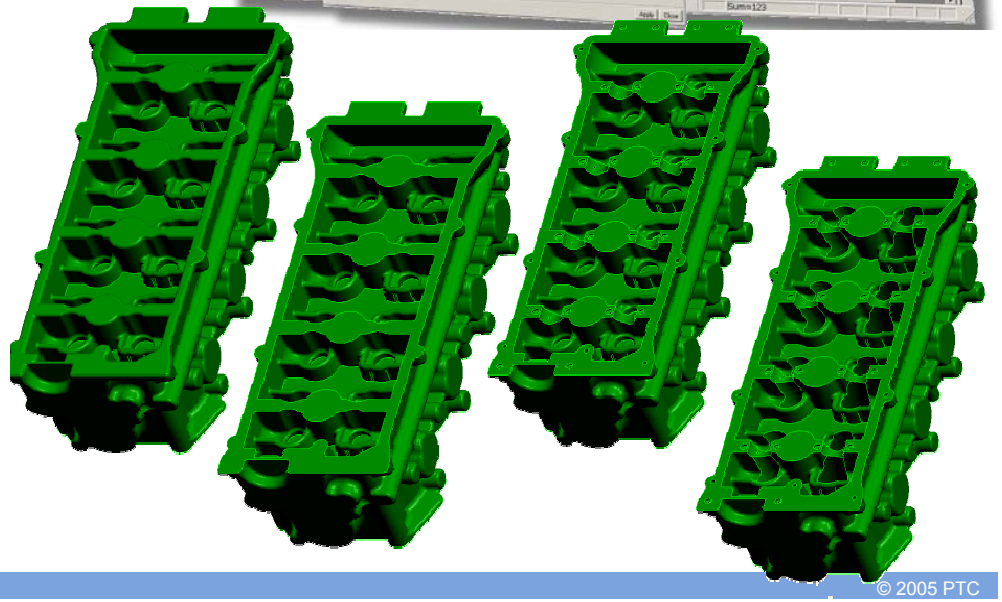
- Multiple Cut/Paste/Re-order
- Line Balancing
- “Ganged” Tool
- Merge holemaking toolpath
- Export / Import (CSV format) process from Excel



Document the process

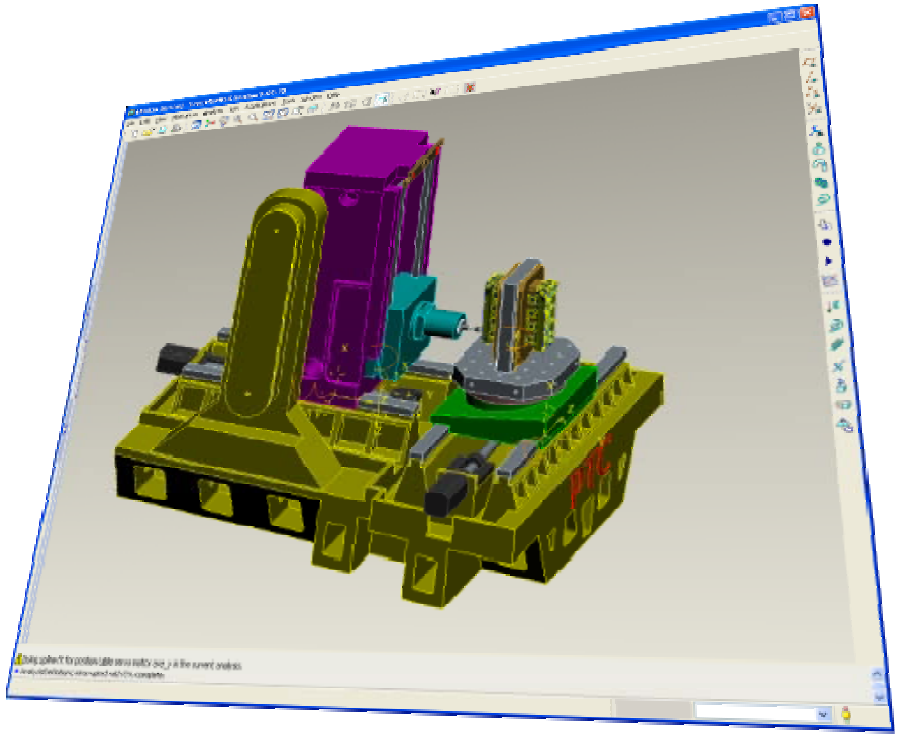
- Automatic creation of in-process model
  - Family part, each instance represent a step in the process
  - Automatic creation of process documentation including critical manufacturing dimensions

Can be used for fixture development



Benefits of capturing process content for downstream use

- Re-use of standard design data, manufacturing processes, and simulation strategies
- Automated, pre-validated manufacturing process generation
- Automated, high-confidence simulation
- Change Management through associativity
- Higher quality products
  - "Design for Manufacturability"
- Future plans include…
  - "Design for Assembly"
  - "Design for Durability"



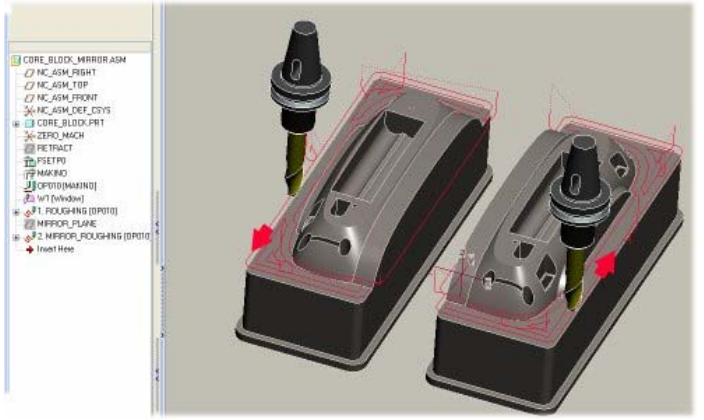
Advanced Manufacturing Functionality

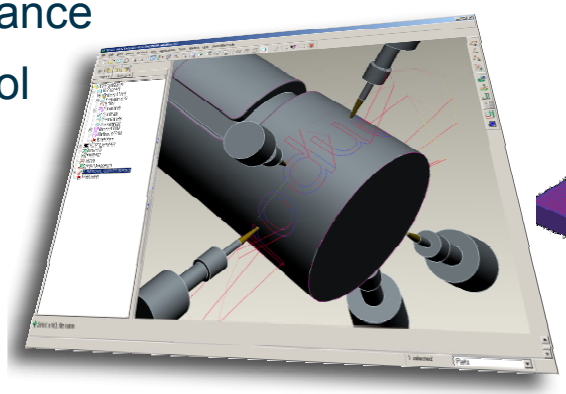
Mirror toolpath while keeping cutting conditions

Toolpath filleting for high speed machining

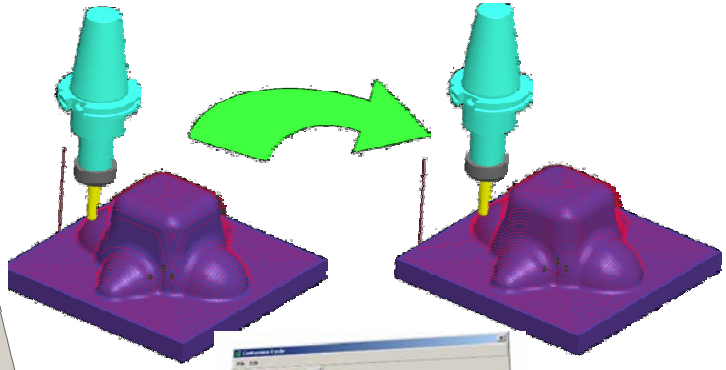
Improved finishing toolpath

- "3D equidistant" step over for finishing"
  - Uniform toolpath and smoother finishing
- Negative stock allowance
- Spiral direction control





Constant step depth for area turning cycle



Engraving on curves

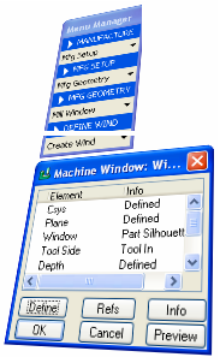
Custom cycles improvements

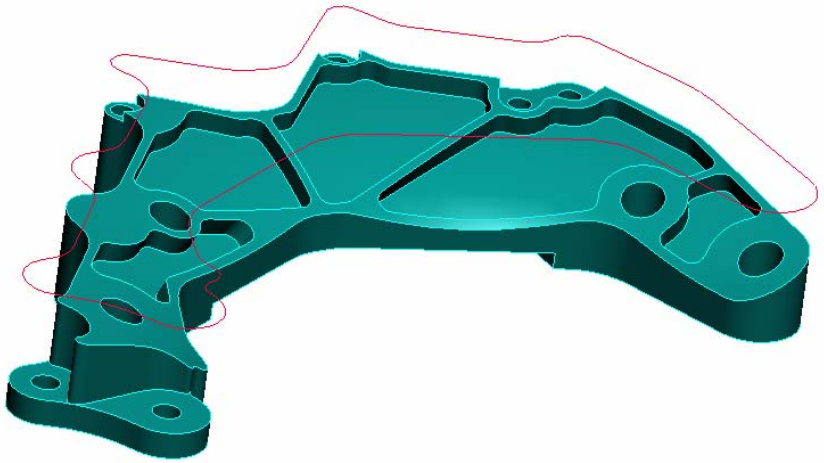
- Insert CL commands
- Support for spindle orientation and jog distance

User Productivity - Mill Window using dashboard

Mill Window by silhouette

- In Wildfire 2.0
  - 10 mouse clicks
  - 4 levels of menu

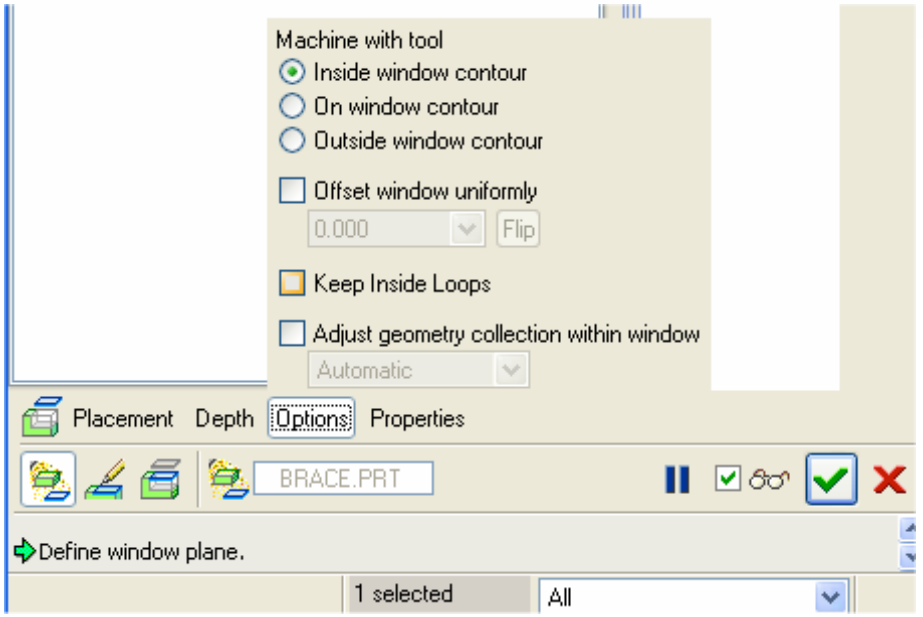




- In Wildfire 3.0
  - 3 Mouse clicks
  - Select directly Mill Window feature icon
  - Dynamic manipulations

    Depth
    Offset

At least 3 times faster !



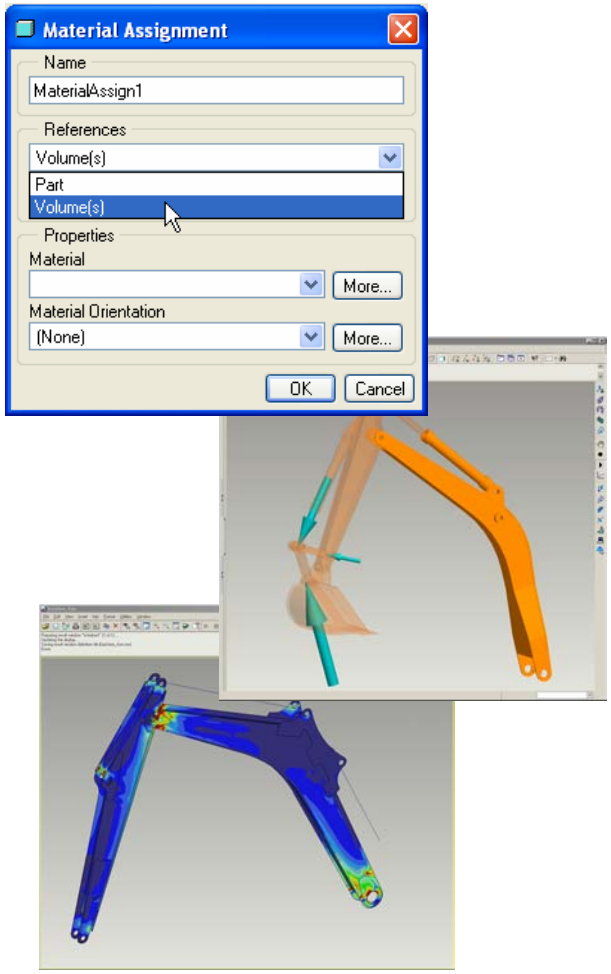
Structural and Thermal Functionality Improvements

Volumetric assignment

- Ability to assign materials by volume
  - Volume regions in a part can have different properties
- Ability to assign heat loads by volume

Inertial relief

- This is the ability to run static analyses on “unconstrained” or “under constrained” models
  - Users simply select a checkbox on the analysis definition dialog
- Externally applied loads are balanced in the solver by equal and opposite body forces (accelerations)



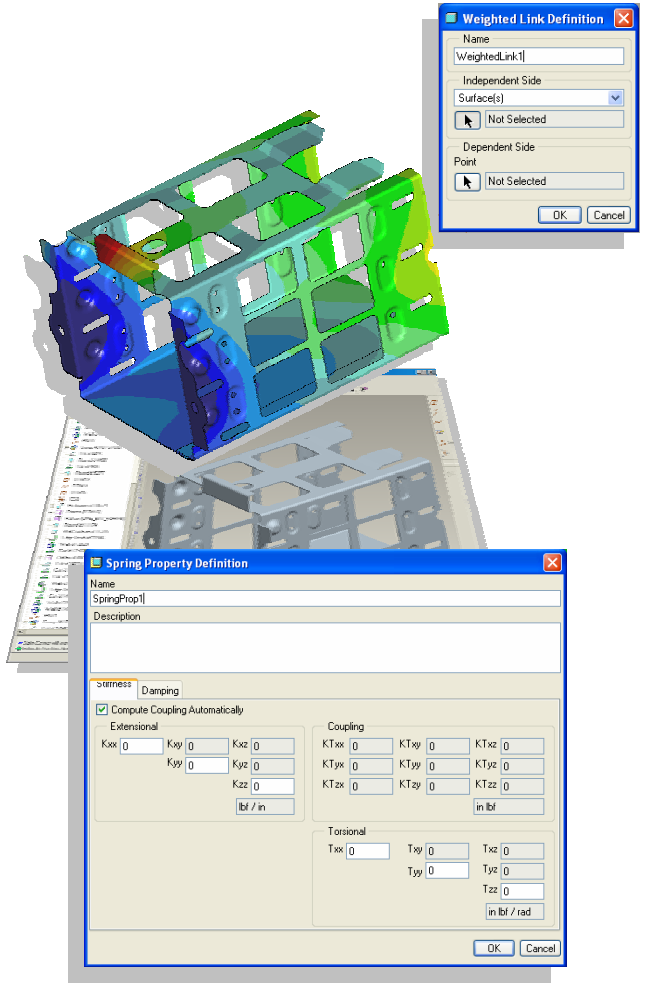
Structural and Thermal Functionality Improvements

"Weighted" links in Mechanica

- Similar in functionality to NASTRAN RBE3
- A point is tied to move the average of the displacements of selected geometry
- A great tool for "smearing out" singular effects over more of a model such as point loads

Advanced springs

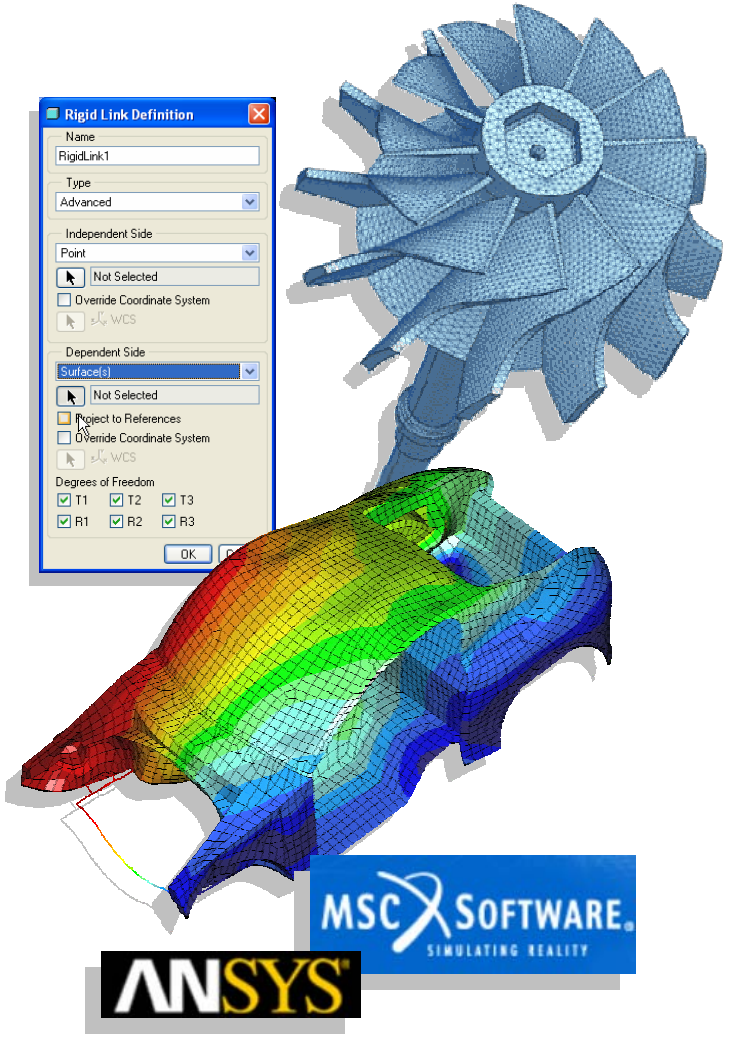
- Now advanced spring definition is supported inside of Pro/ENGINEER
- Full stiffness and coupling matrix may be defined
  - Users also have the option to disable the "auto coupling" of simple springs



Structural and Thermal FEM Improvements

FEM mode specific enhancements

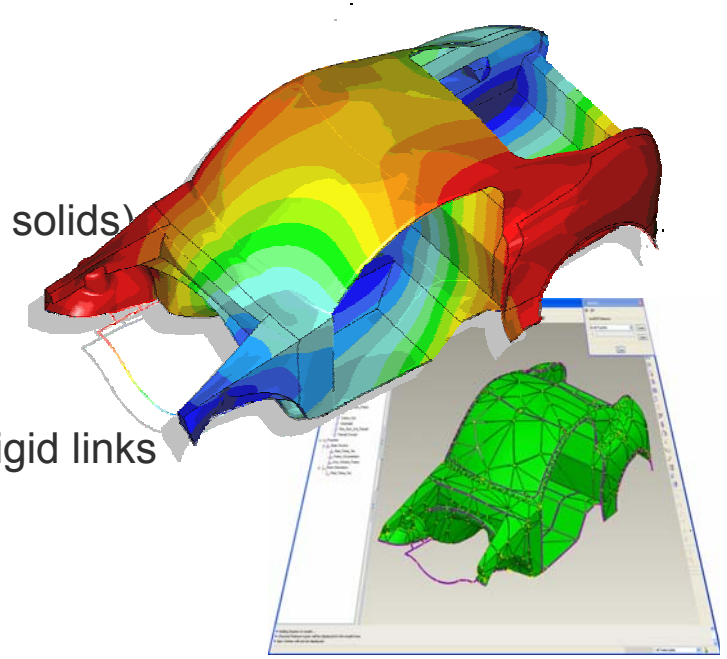
- Spot weld connections supported for ANSYS and NASTRAN
- Rigid links enhancements (one to many)
- New modeling entities output to ANSYS
  - Rigid links
  - Beam releases
- Display only mode in Run dialog
  - Allows preview of output without writing the model to file
- Supported solvers include...
  - ANSYS 9.0
  - MSC.NASTRAN 2005 r1



Structural and Thermal Robustness Improvements

Robustness

- Meshing robustness
  - Very large model AutoGEM robustness (200K+ solids)
  - FEM solid and tri surface meshing robustness
- "Assembly modeling methodology" in FEM
  - Mid-surface compressed models "joined" with rigid links
- Tolerance report



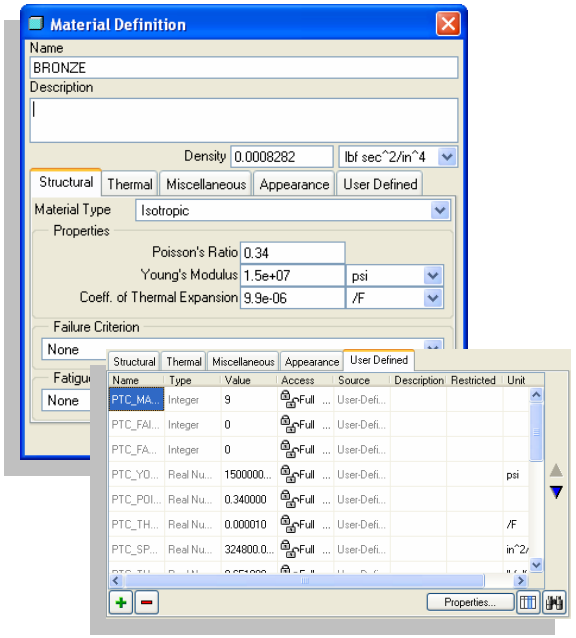
Performance Improvements

- Removal of the 8 Gb memory limit on 64 bit operating systems
- Mechanica running on Linux
- Windows XP 64-bit support
  - Intel Xeon 64
  - AMD Opteron 64

New Materials Definition UI/Database

Materials in Pro/E are completely overhauled

- Materials in Pro/E are being enhanced to support Simulation requirements
- Database will be open and extendable
  - Including the ability to add user defined parameters to materials
  - Each materials property has units associated
- Part materials will be “seen” at assembly level in Mechanica



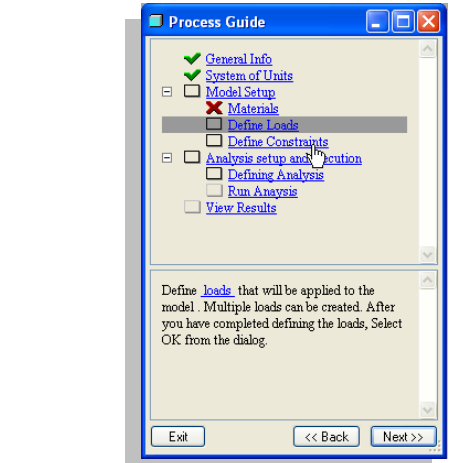
New functionality includes...

- User defined material parameters
- Assign materials in family tables
- Assign appearance by material

Process Guide for Structural Simulation

A user customizable “wizard” that can be used alongside the standard user interface

- Defined by a user specified xml file
- Each “process” consists of one or more tasks
- Users simply follow the steps listed in the tasks



What problem does Process Guide address?

- Some Product Development activities are very “process oriented”, such as manufacturing or analysis
- It is not uncommon for an engineer to perform analysis only a few weeks a year
  - If a design cycle is 9-12 months, only a few weeks of that time may be simulating the design...
- Some analysis tasks consist of repeatable processes
  - These may be dictated by expert users or analysts
- Pro/E’s simulation tools are robust and easy to use, but for infrequent users the difficulty is not in the “clicks and picks” but in the sequence of events

Process Guide for Structural Simulation

The process is made up of discrete tasks

- "Experts" or consultants can define process templates
  - These are an xml file with the data that will populate Process Guide
- 37 different actions and may be defined, including...
  - Info links – links to online help, company intranets, etc...
  - Action links – loads, constraints, idealizations, etc...

The resulting process file has some intelligence

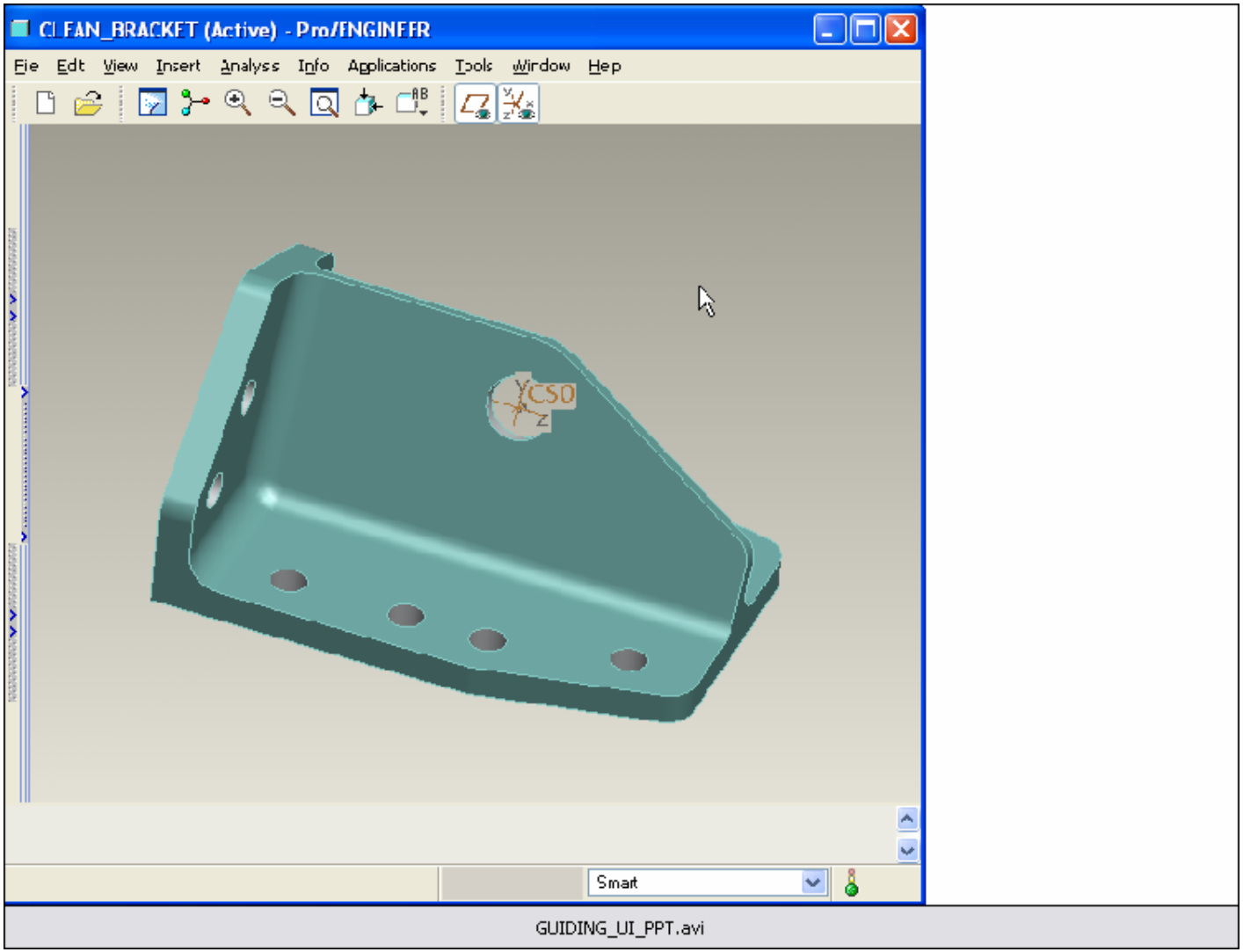
- If created entity is deleted, task is invalidated
- Sub-steps may be created
- Some tasks are order dependant
  - Analysis must be run before results may be viewed

Each task may contain

- Text
- One action and multiple informational links
- Embedded images

```
- <GuidingUIProcess>
    <header product="GuidingUI" fileVersion="1.0" />
    <!--  Process Definition for StaticAnalysis   -->
  - <process id="0" name="StaticAnalysis">
      <task id="1" object="ModelType" type="PStructural" />
    - <task id="2" object="Info" label="General Info">
      - <description>
          This process template will guide users through the setup, soluti
          results of a generuc static analysis.
          <br />
          <br />
          For more details on the commands and dialogs used, the online
          accessed through this
          <infolink href="D:\User Profiles\ckatsis\My Documents\W\scrat
            \static_over.htm">link</infolink>
          .
        </description>
      </task>
    + <task id="3" object="UnitInfo" label="System of Units">
      <!--  Setup model task w/ loads, constraints, materials sub-ta
    + <task id="4" object="Info" label="Model Setup">
      <!--  Analysis setup and execution  -->
    + <task id="10" object="Info" label="Analysis setup and execution">
      <!--   Show results for run of the analysis created in task 11
    + <task id="13" Object="ResultTemplate" Label="View Results" analysis="
        template="GENERIC_STATIC.rwt" mode="combine">
    </process>
  </GuidingUIProcess>
```

Process Guide for Structural Simulation

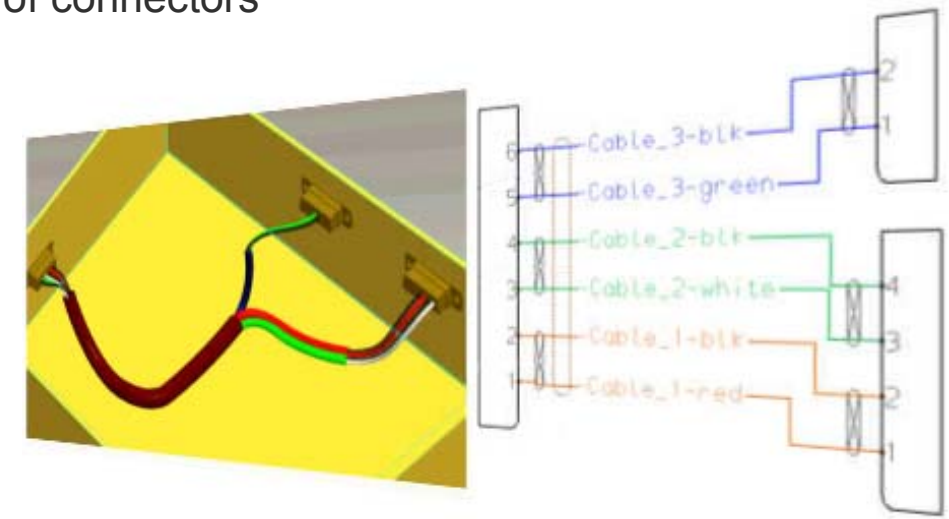


Sample Guiding UI session - 3 min. in length

Pro/CABLING – Multilevel Cables

Cabling Enhancements

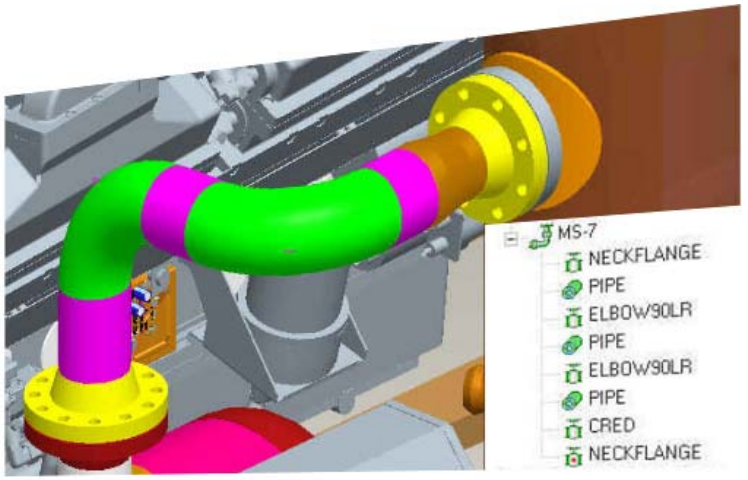
- Cable and Harness Mfg Start Parts
  - Harness creation
  - Harness Mfg
  - Flattened harness
- Assemble Parent Connector
  - Config Option to control assembly of connectors
- Multi Level Cables
  - Retain Cable Hierarchy from RSD



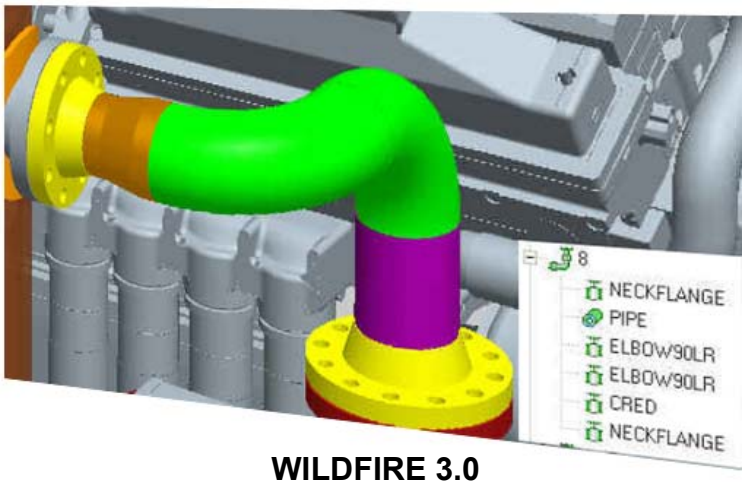
Piping Enhancements

- Allow Continuous Fittings
  - Enable insertion of no-break fittings

    Pipe clamps, markers, support, etc
- Enhance Fitting Insertion
  - Individual csys that is not connected with any pipe
  - A port of an equipment nozzle
  - A port of a fitting/nozzle, which is not connected with any pipe of the active pipeline.
  - A port of a fitting, where the fitting is a member of a group of face-to-face connected fittings, and none of the fittings are connected with any pipe of the active pipeline.



WILDFIRE 2.0



WILDFIRE 3.0

ModelCHECK

Assess Skills and Monitor Modeling Trends with ModelCHECK Administrator

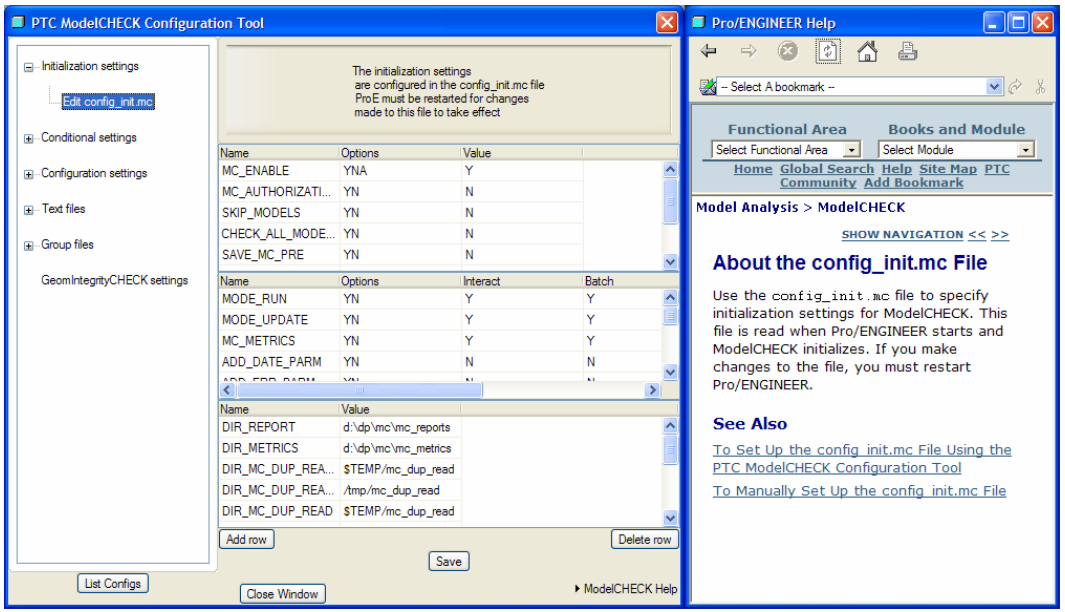
- Provides Report on Error Trends, and Individual Skills

Configuration GUI Improvements

- Linked Help for all options

ModelCHECK TK for custom checks

ModelCHECK support for Annotation Features



Exceed 2 Gb memory limitations with Pro/E Wildfire 3.0 running on Windows 64-bit

Support of Pro/ENGINEER 64-bit on both AMD and Intel class workstations running Microsoft Window XP-64

Pro/E Wildfire 2.0 support this spring

Pro/E Wildfire 3.0 support at Production Release

Benefits:

- Ideal solution to deal with large assemblies
- Improved memory allocation
- Improved 32-bit to 64-bit migration on the same system
- Reduced time working around 32-bit limitations
- Improved total cost of ownership and price performance
- Improved productivity boost dealing with simultaneous running applications, such as Pro/ENGNEER and Pro/ENGINEER Structure and Thermal Simulation

Pro/ENGINEER Wildfire 3.0
Connected

Seamless, Integral “Create” component of the PTC Product Development System

PTC®
The Product Development Company™

Improved Pro/E Openness

Access to PDMLink and ProjectLink databases for Distributed Batch activities

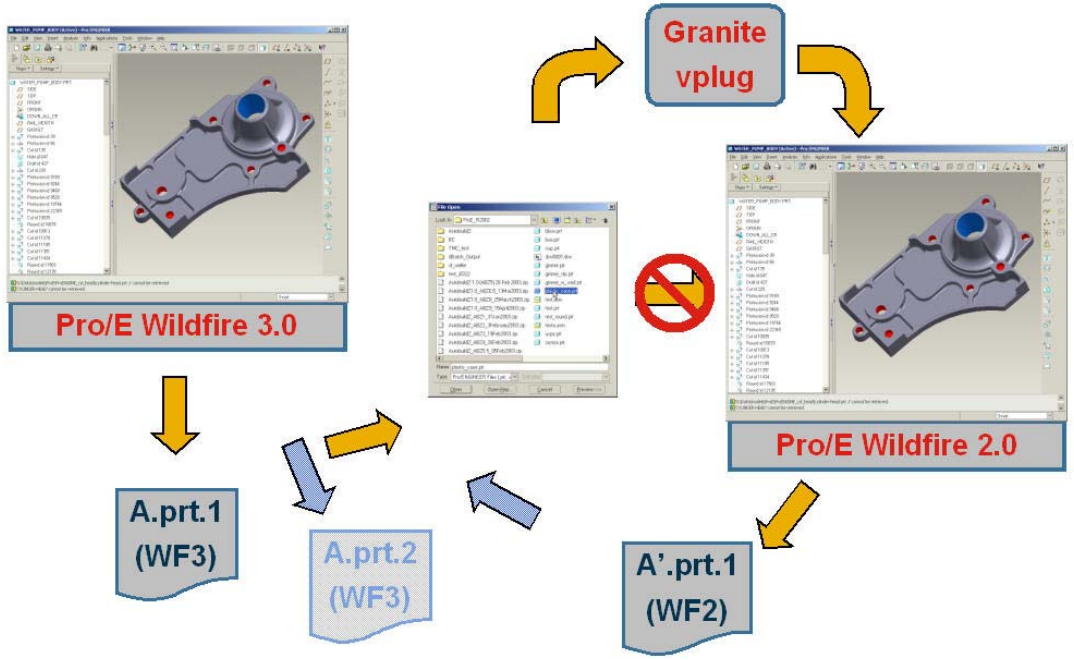
Open native Pro/E Wildfire 3.0 parts and assemblies in Pro/E Wildfire 2.0

- No need to create Pro/E neutral (.neu) files

In Pro/E Wildfire 2.0, original features become READ ONLY features

- Entire feature list will be displayed, along with associated parameters
- Cannot be modified
- Can be referenced
- Will update via the ATB

New features can be added in Pro/E Wildfire 2.0, and then automatically "Grafted" onto the model in Pro/E Wildfire 3.0



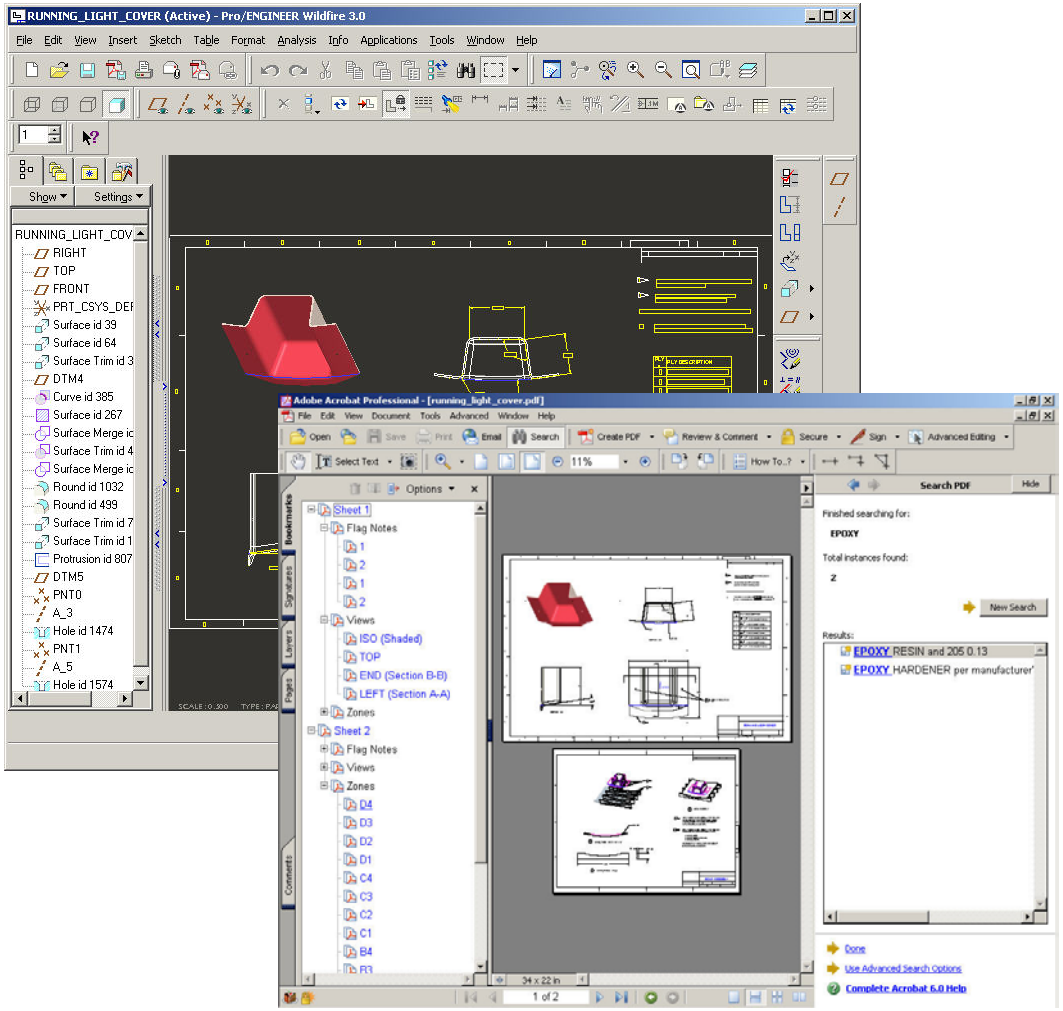
Advanced PDF Export – *new* Interface for PDF

Push-button .pdf file creation

Resulting file supports…

- Navigation and Bookmarks
- Searchable Text
- Drawing Measurements
- Greater security via Adobe's Digital Right's Management

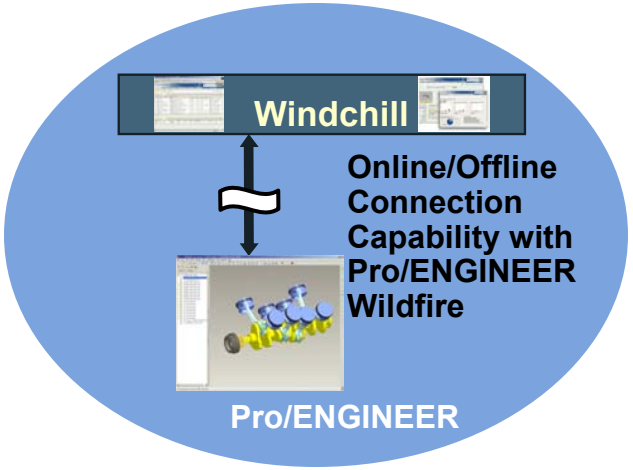
Adobe Distiller is not required



Introducing Offline Workspaces

New Capabilities

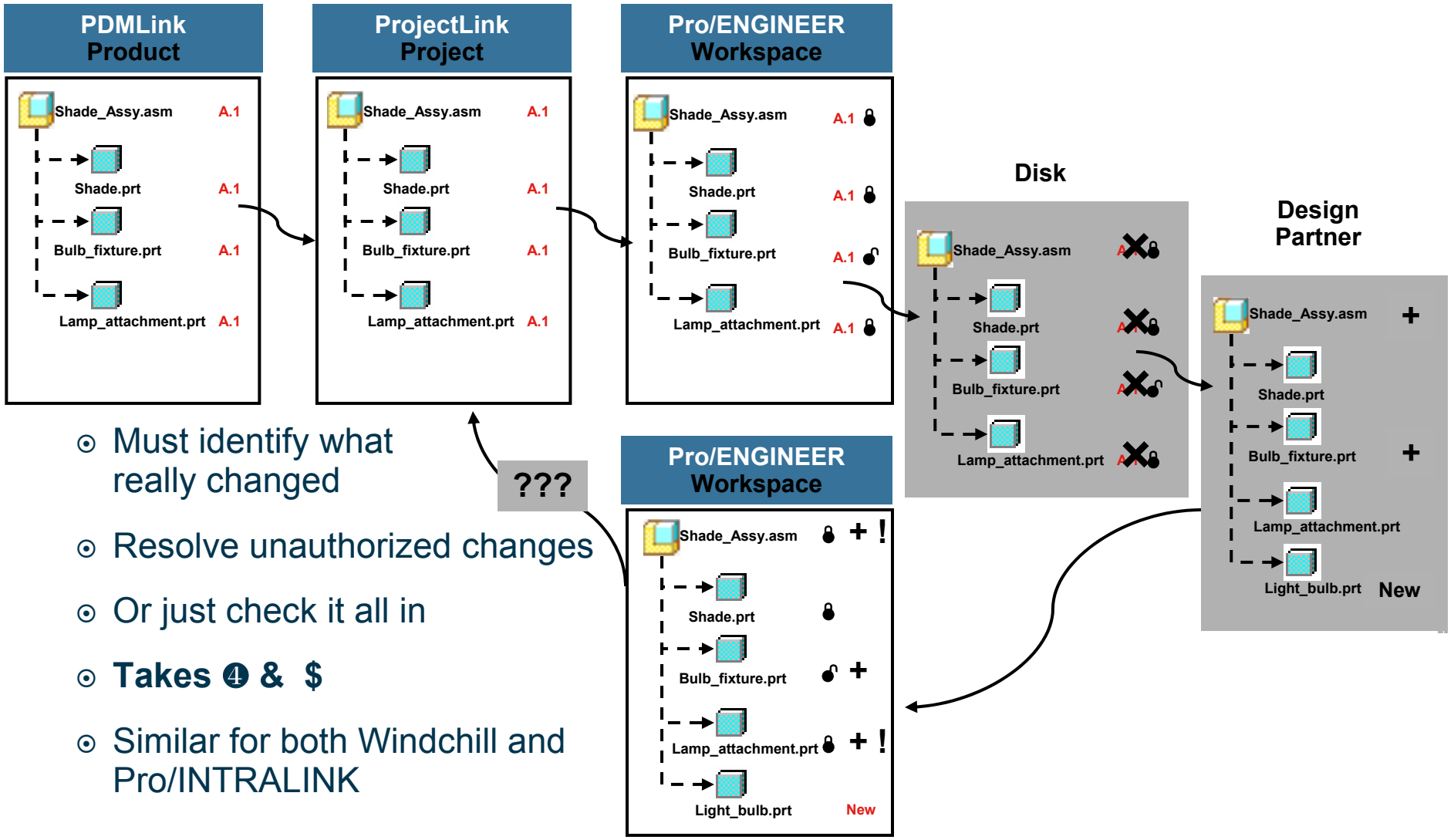
- Provide Pro/ENGINEER Wildfire workspace access when there is a Network failure or Server failure
- Notification of connection drop
- Checking for server availability
  - Automatic and manual reconnection
- Synchronization and conflict resolution of Pro/ENGINEER workspace when connection is restored
- Offline workspace HTML UI with subset of workspace commands
- “Soft” local cache size restriction
- Supported for Support for Windchill Foundation, PDMLink, & ProjectLink (incl. bundled)



Benefits

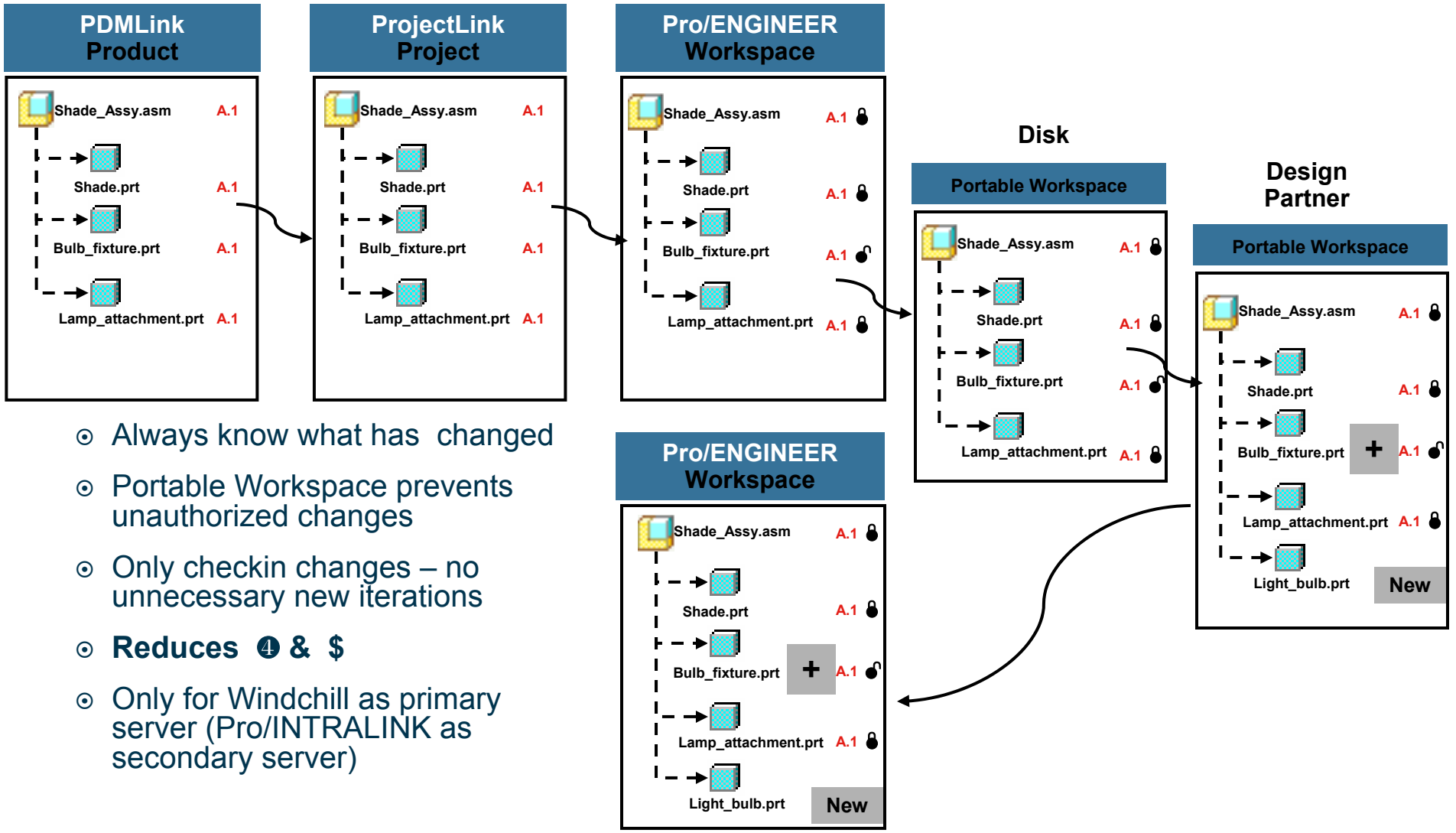
- Facilitate collaboration with remote users
  - Design partners, Suppliers, or Users with temporary or unreliable connections

Exchanging Pro/ENGINEER Data Today



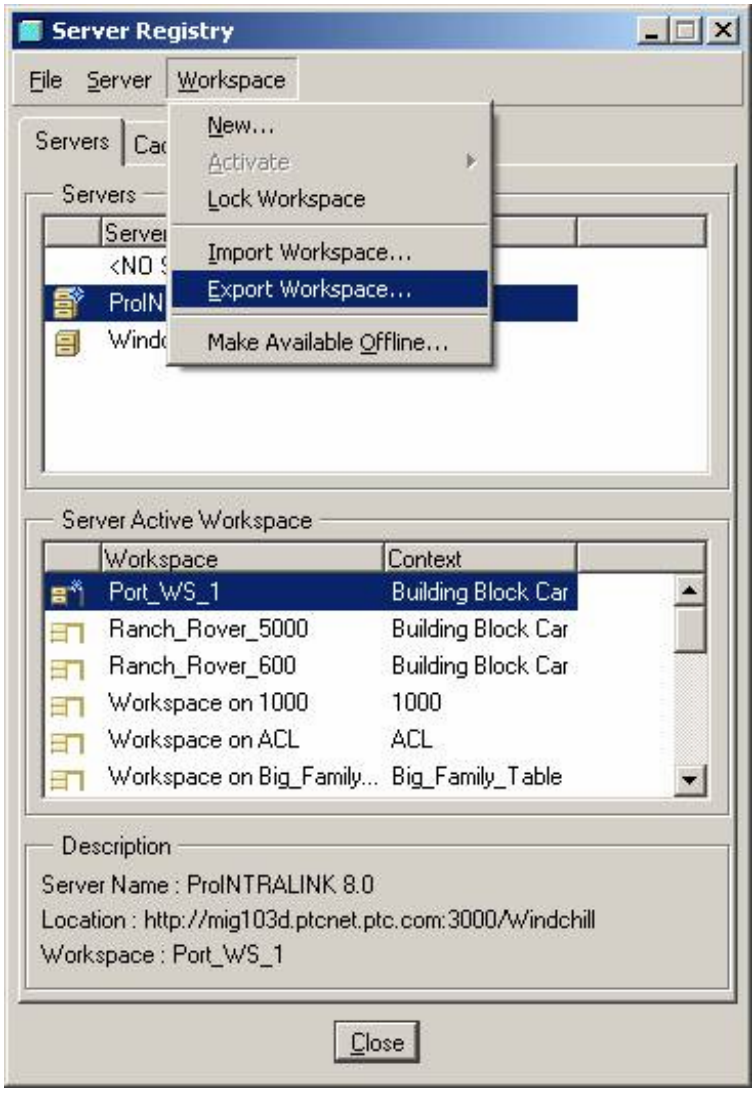
- Must identify what really changed
- Resolve unauthorized changes
- Or just check it all in
- **Takes ❹ & $**
- Similar for both Windchill and Pro/INTRALINK

Exchanging Pro/ENGINEER Data with Portable Workspace



- Always know what has changed
- Portable Workspace prevents unauthorized changes
- Only checkin changes – no unnecessary new iterations
- **Reduces ❹ & $**
- Only for Windchill as primary server (Pro/INTRALINK as secondary server)

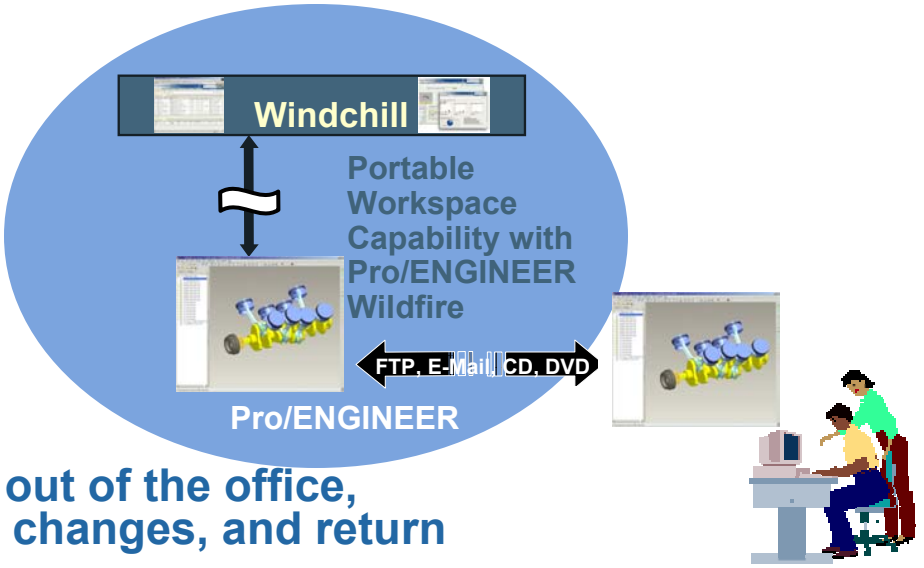
Portable Workspace UI



Portable Workspace Benefits

Eliminates cost and complexity of exchanging Pro/ENGINEER data with suppliers

- For Pro/INTRALINK
- For Windchill
- Without direct network access



Can easily take Pro/ENGINEER work out of the office, track changes, enforce unauthorized changes, and return data set back to PDM system

Extend reach of ProjectLink for supplier collaboration

- Without direct network access or
- Prior to direct network access

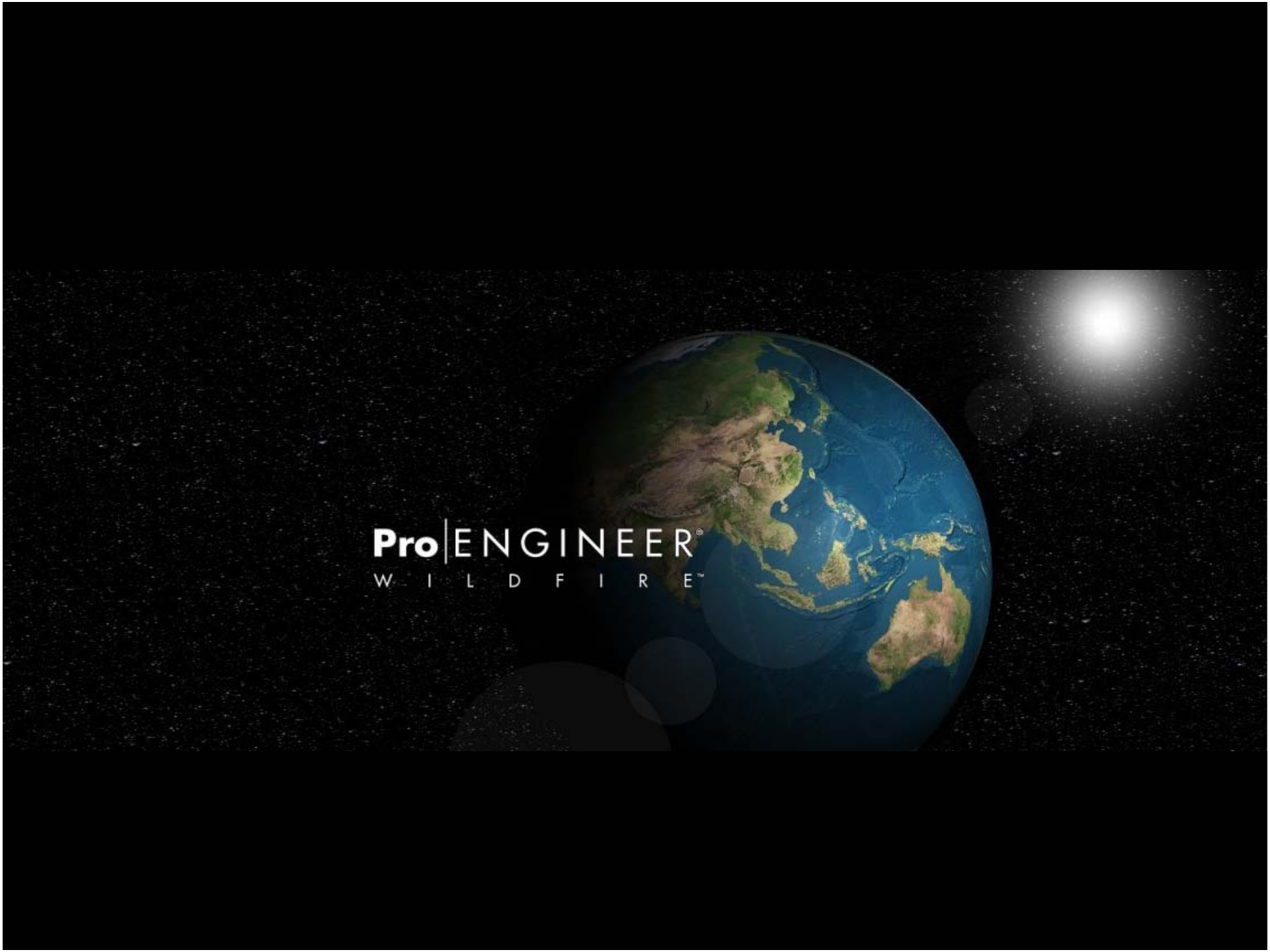
Improved Pro/E Data Management via PDMLink

Unified Graphical Model Status

- Consistent presentation of model status (e.g. complete, incomplete, checked in, checked out, modified) in Windchill and Pro/E

Improved Change Management

- Eliminate “null” changes, difference report enhancements, automatically attach during check-in, improved classification of changes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