

# What's New in NX 12

NX Product Marketing Team  
October 2017



**SIEMENS**

*Ingenuity for life*

# NX 12 for Product Design

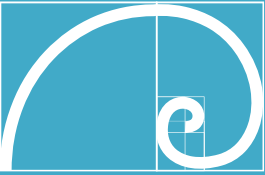
Remove the barriers to innovation

# Technological forces transforming industry

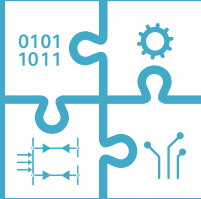
## Changing the way products come to life

## Changing the way products are realized

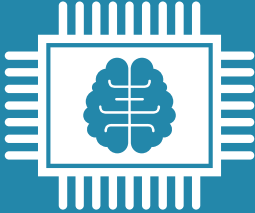
## Changing the way products evolve



**Generative design**




**Intelligent models**



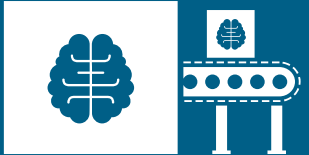
**Intelligent automation**




**Additive manufacturing**



**Cloud ecosystems**



**Knowledge automation**



**System of systems**

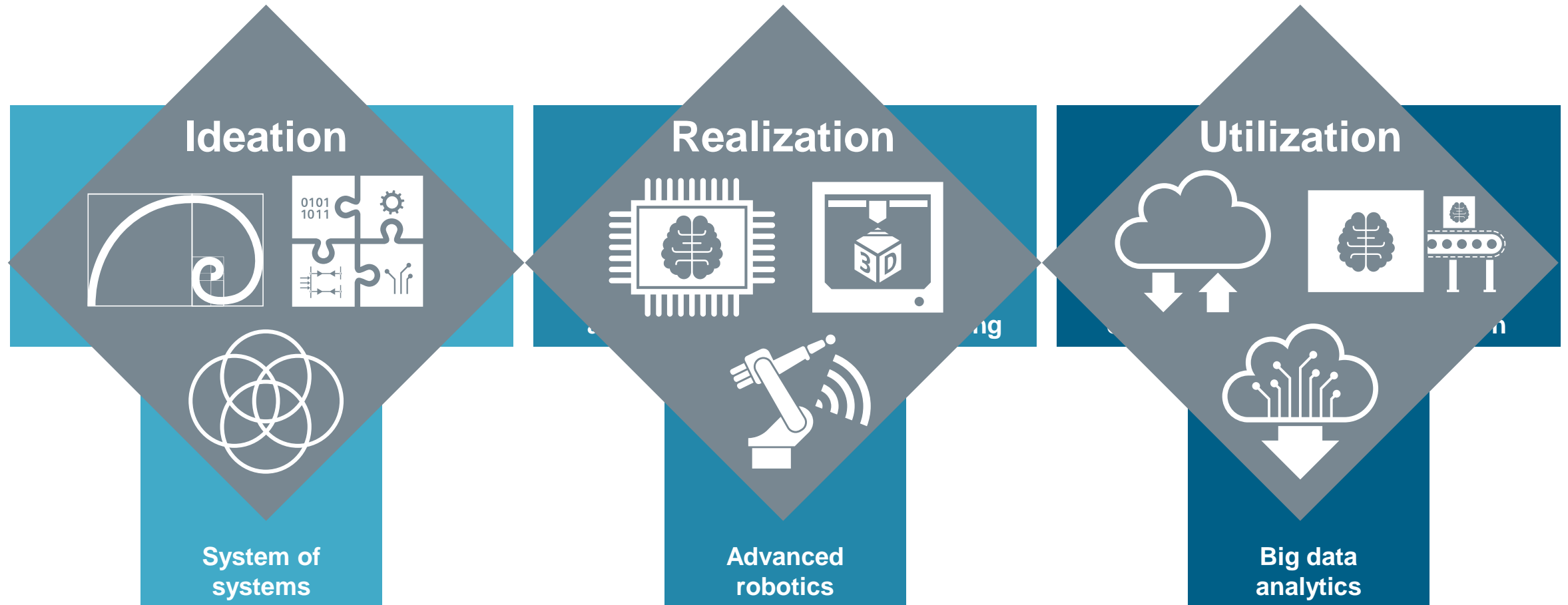


**Advanced robotics**



**Big data analytics**

# Manufacturers must embrace the technologies and transform their business into a digital enterprise





# Digitalization changes everything

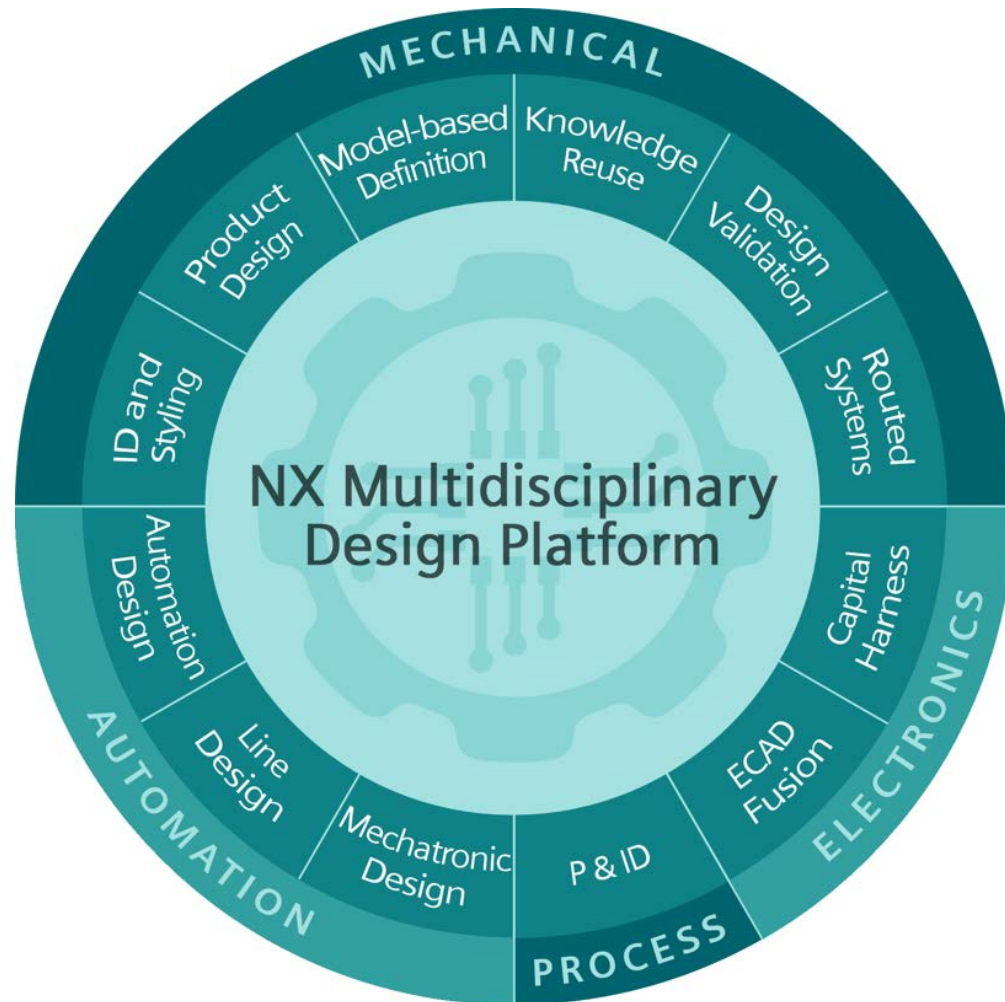
The next trillion dollars will be earned with data – for our customers and for our industries.

*Michael Dell, founder of Dell Inc.*

Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000.

*Pierre Nanterme, CEO Accenture*

# Delivering a platform for Multi-Disciplinary Design



## Our Vision

- Leverage information from multiple disciplines without deep knowledge of discipline specific applications
- The ability to relate the representations of an object used by different disciplines
- Ability to navigate between representations and understand which representations exist
- Ability to create libraries that contain representations of the same object for different disciplines

# What's New in NX 12 CAD Topics

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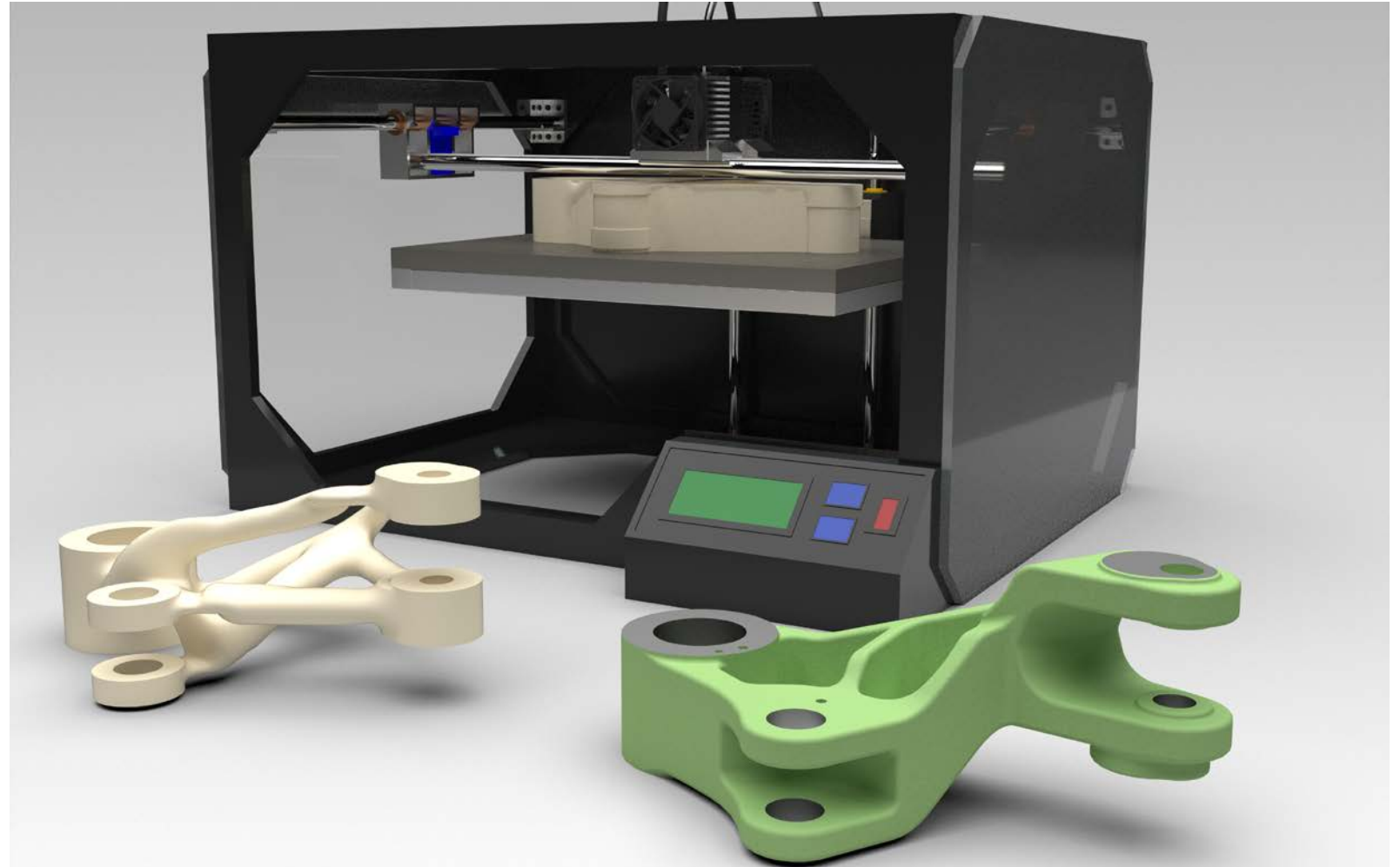
Modeling

Process-Specific  
Design

MBD and Drafting

Teamcenter Integration

User Experience



# What's New in NX 12 CAD Topics



**Modeling**

**Easier to use with more control and options than ever**

**Process-Specific  
Design**

**MBD and Drafting**

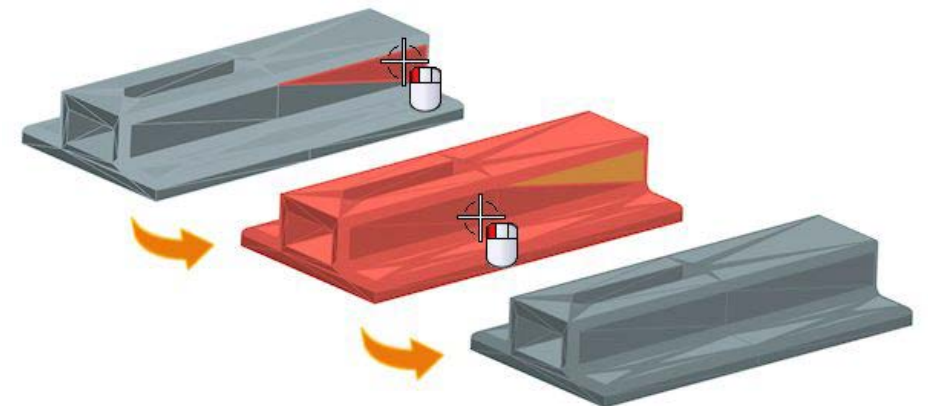
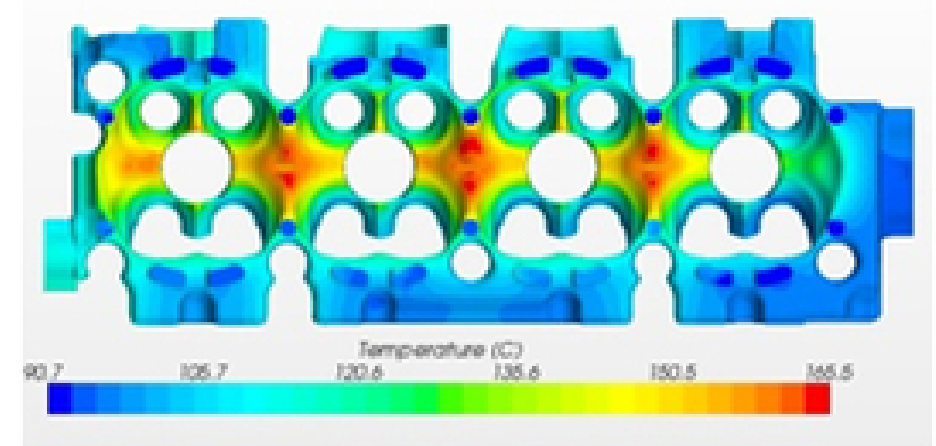
**Teamcenter Integration**

**User Experience**



# Convergent Modeling

- Capability
  - CAE Mesh on convergent bodies
  - Select facets by region or rule
  - Merge and divide facet faces
  - Analyze and repair facet bodies
  - Offset facet bodies and create transitions
- Customer Benefit
  - Scan to analysis with no translation
  - Easier to work with facet data
  - Quickly simplify, modify and refine facet data
  - Easy data cleanup
  - Create new geometry based on facet bodies

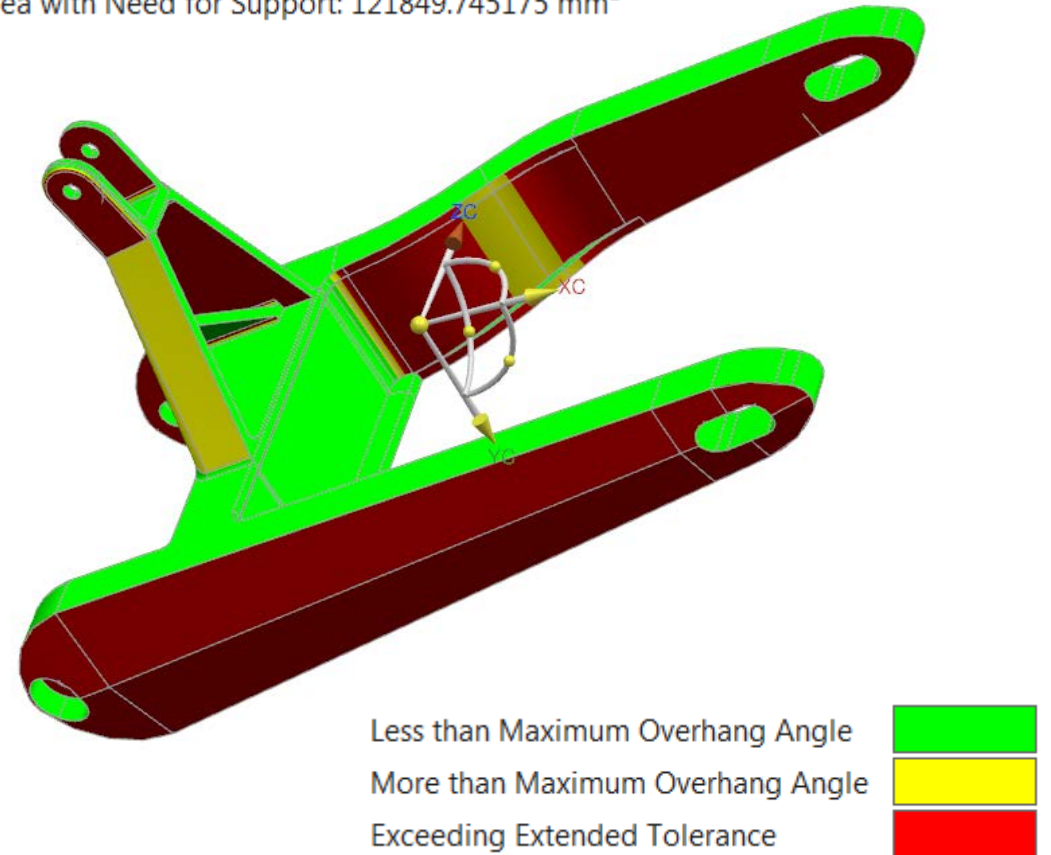


# Design for Additive Manufacturing (DfAM)

- Capability
  - New checkers to identify build issues early
- Customer Benefit
  - Design time decision making ensures part is built correctly the first time
  - Speed time from design to build by identifying build issues early

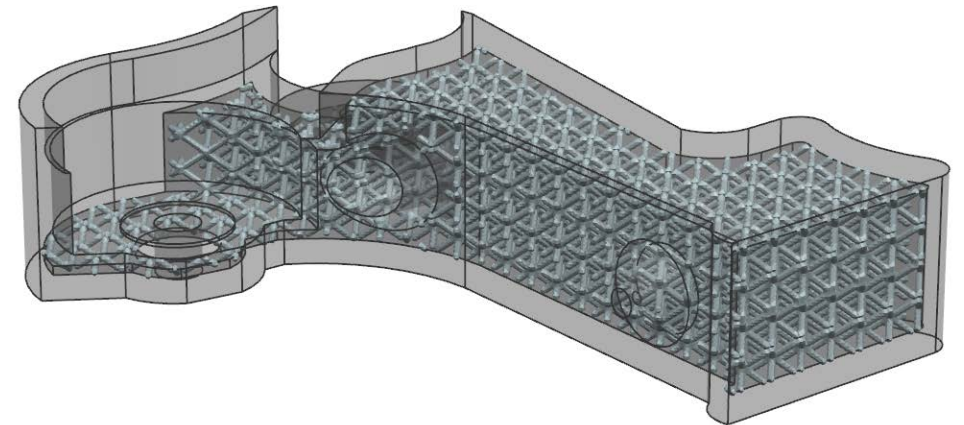
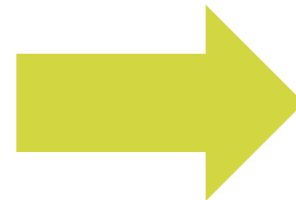
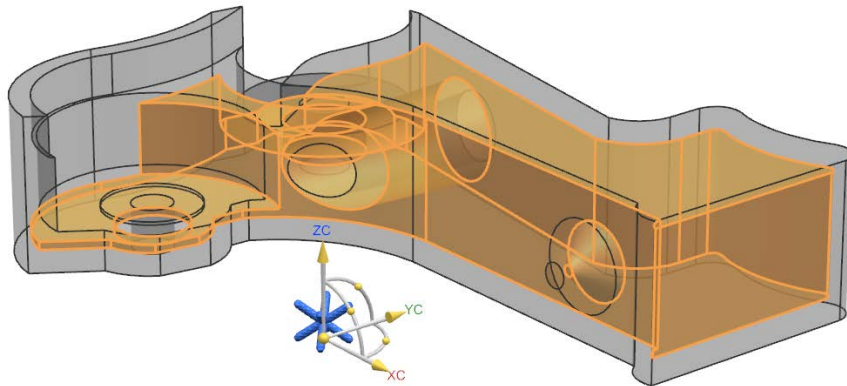
Overhang Area 

Area with Need for Support: 121849.745175 mm<sup>2</sup>



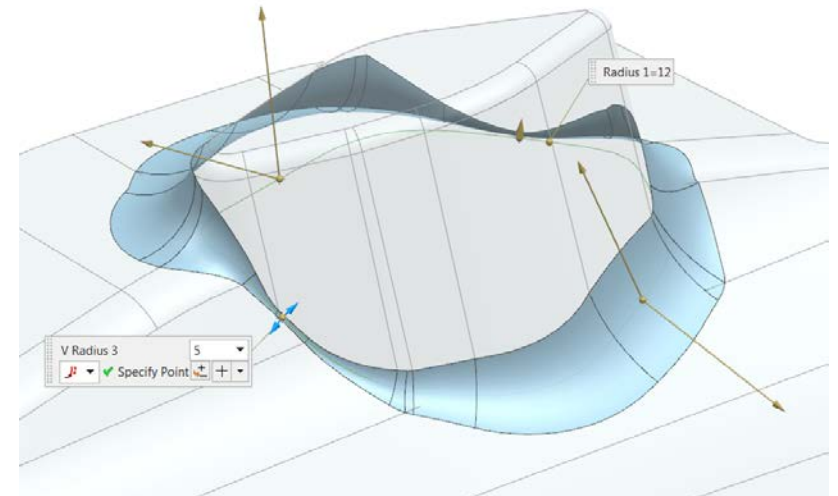
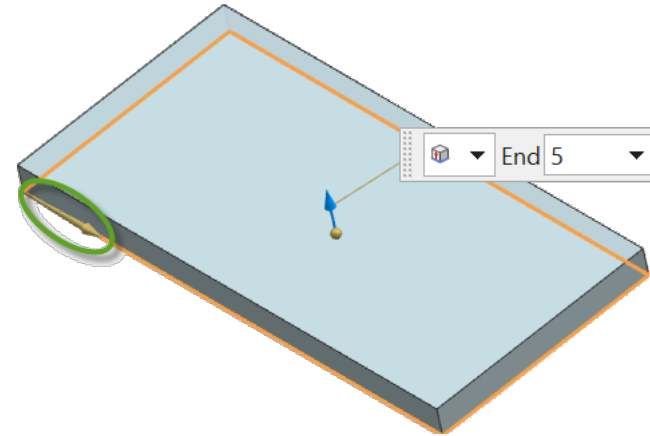
# Lightweight Structure Design

- Capability
  - Fill a volume with lattices
  - Lattices are represented as facets
- Customer Benefit
  - Easier to design lightweight parts
  - Reduced material use



# Feature Modeling Usability Enhancements

- Capability
  - Feature section direction display
  - Child feature deletion options
  - Blend and draft robustness improvements
  - New options for Product Interface creation and editing
- Customer Benefit
  - More control over feature creation and editing
  - More robust models require less time-consuming cleanup
  - Easier, faster part linking and collaboration

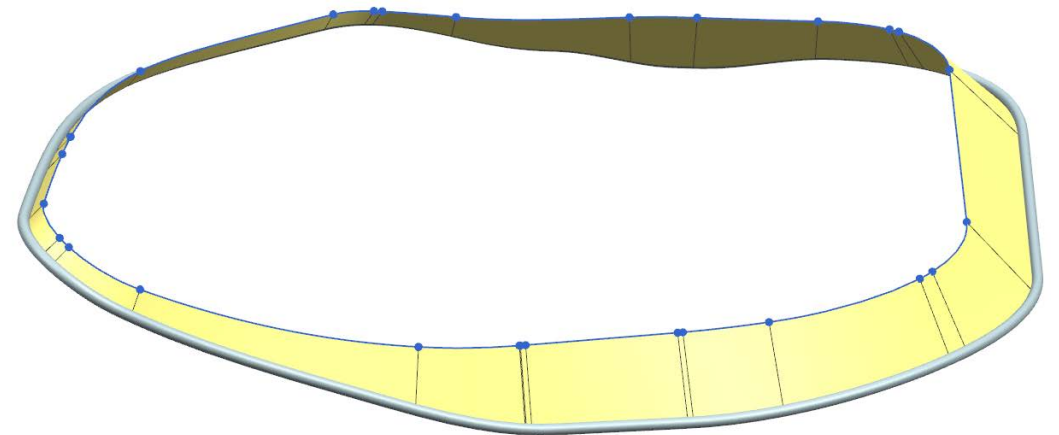
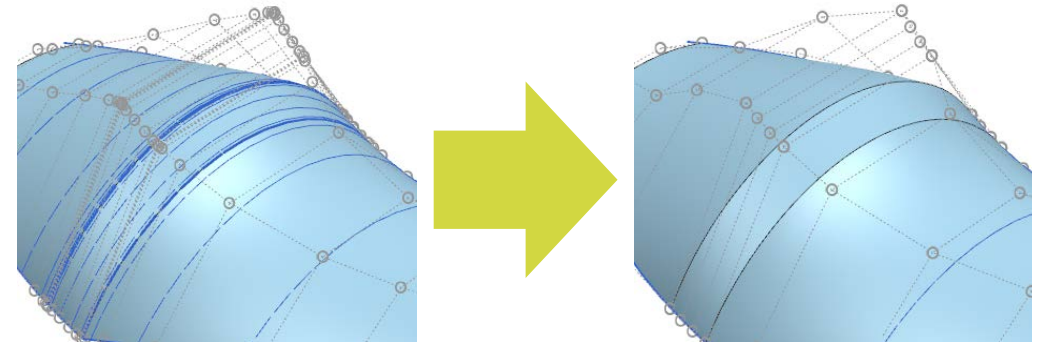


# Feature Modeling

## Section Surface Enhancement

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- Capability
  - New lofting engine
  - More options to control and define surfaces
- Customer Benefit
  - 95% performance improvement
  - Improved quality and accuracy



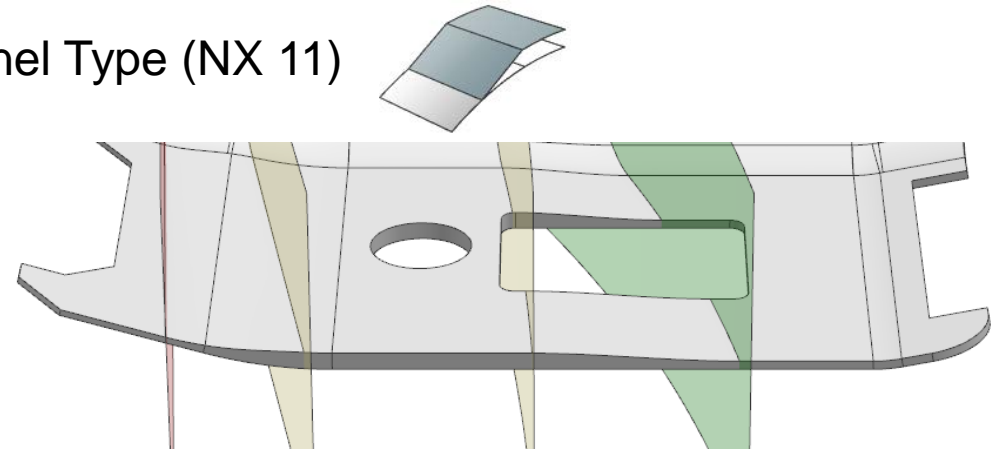


# Feature Modeling

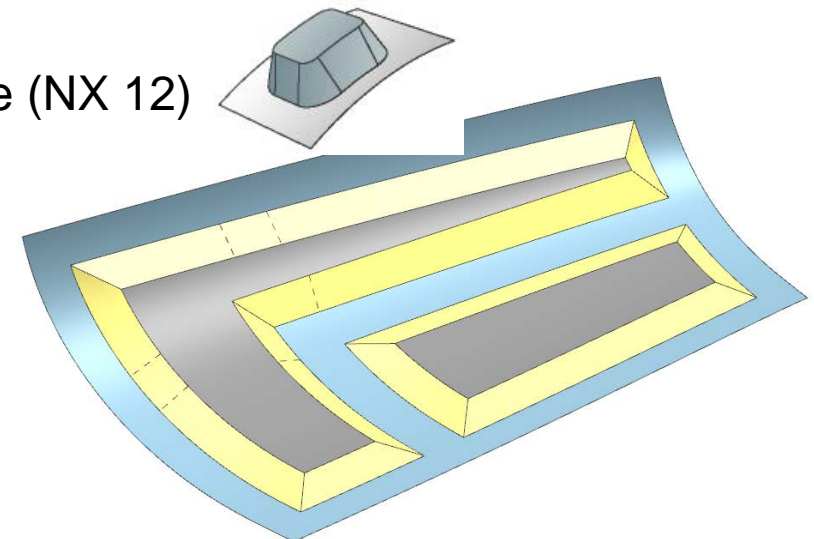
## Variable Offset Face

- Capability
  - More offset types
  - New option to offset as solid
  - Create offset regions of different thicknesses
  - Improved support of multi-material parts
- Customer Benefit
  - Faster creation of complex surfaces
  - More robust method for creating lightweight parts
  - Easier embedded electronics creation

Panel Type (NX 11)



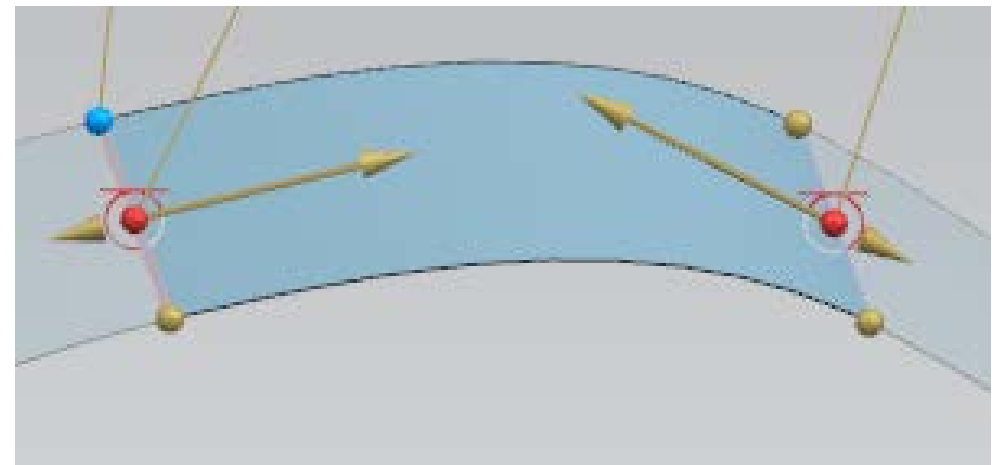
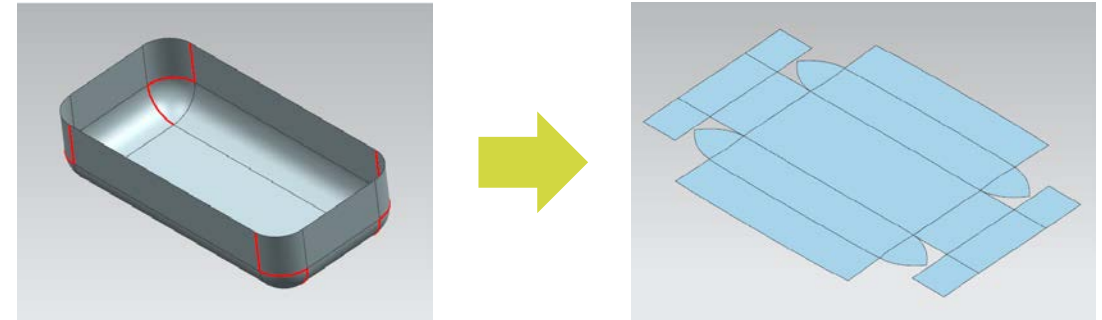
Pad Type (NX 12)



# Freeform Modeling

- Capability
  - Improved control when flattening and forming surfaces
  - More options for section surface creation
- Customer Benefit
  - Flatten complex shapes without distortion
  - Faster feature updates
  - Easier to create the geometry you need

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# Assembly Modeling

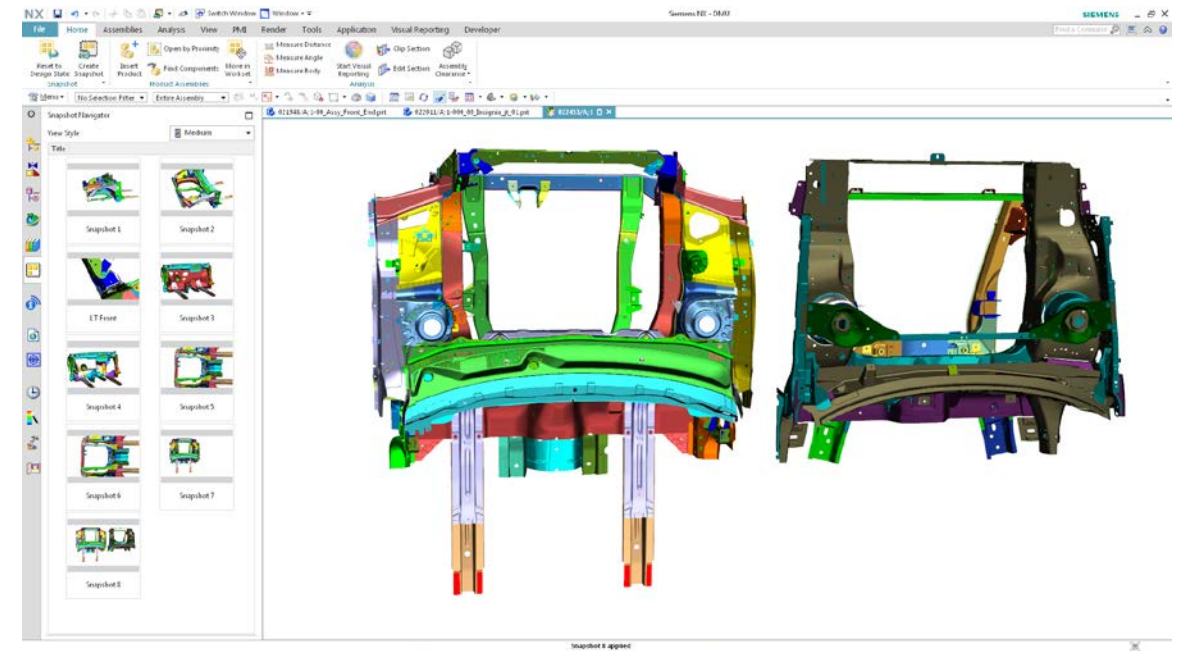
## Improved Load Performance

- Capability
  - “Under the hood” improvements that make assemblies load much faster
  - Geometry is displayed during the load process
  - Reduced memory usage
- Customer Benefit
  - Easier to work with large assemblies
  - Ability to load larger models



# Assembly Modeling General Enhancements

- Capability
  - Add components in a single user interface
  - Automatic placement of new components based on assembly context
  - Dedicated environment for digital mockup
  - Snapshots to save display states
- Customer Benefit
  - Simpler command flow
  - Reduced manual selection effort
  - Significant time and effort reduction
  - Easier design reviews that allow for more experimentation



# What's New in NX 12 CAD Topics



**Modeling**

Easier to use with more control and options than ever

**Process-Specific Design**

More efficient and versatile workflows

**MBD and Drafting**

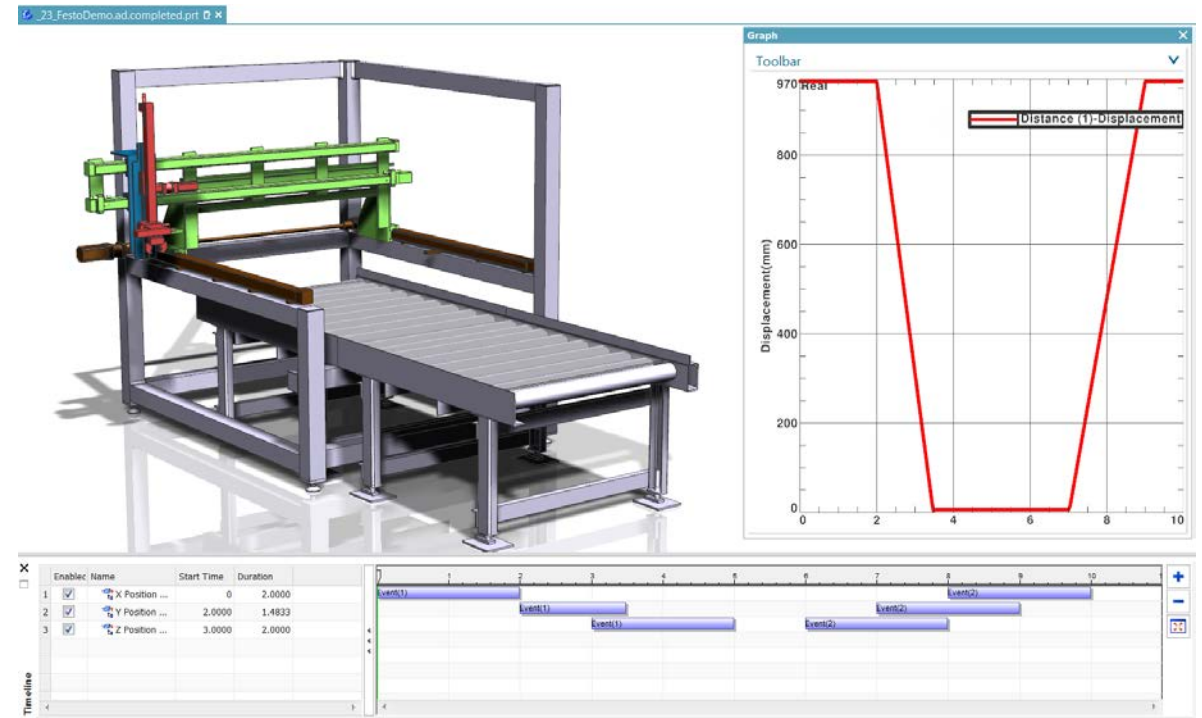
**Teamcenter Integration**

**User Experience**

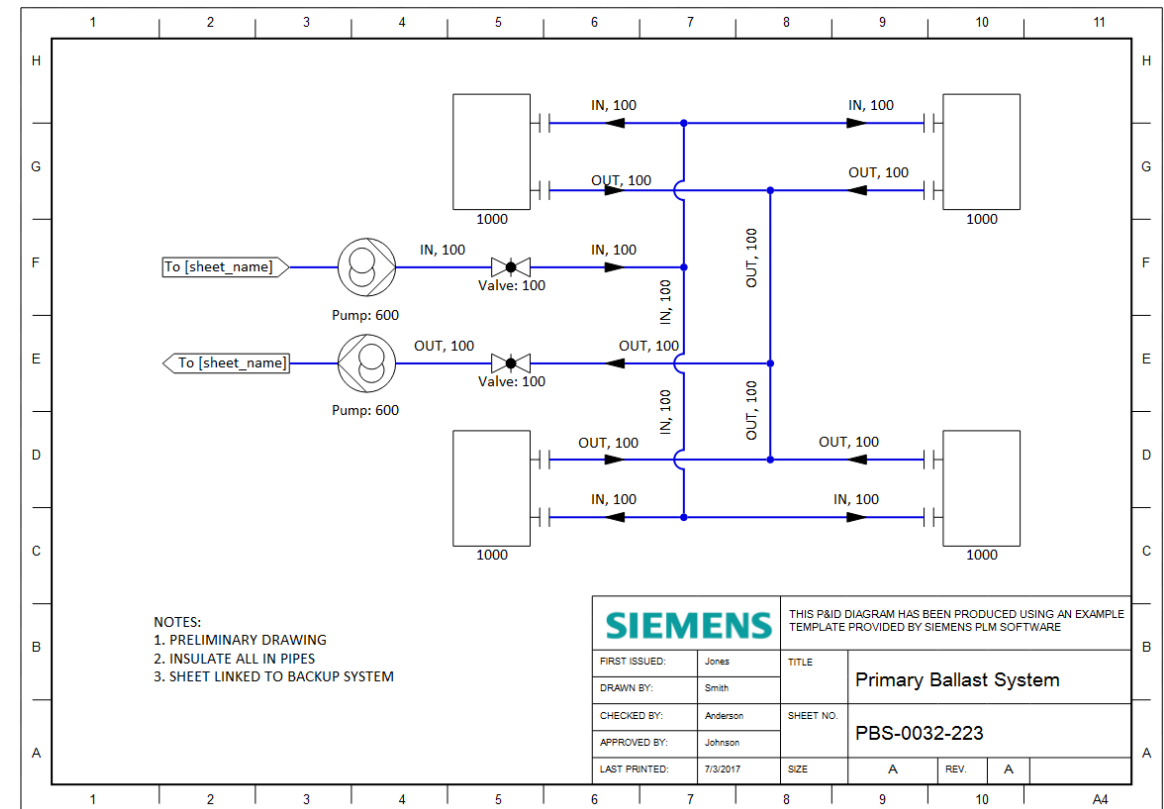


# Animation Designer

- Capability
  - Animate almost any type of geometry
  - Simple command structure
  - Automatic collision detection
- Customer Benefit
  - Reduced need for physical prototypes
  - Find and repair issues in the same environment
  - Higher quality through faster design iteration



- Capability
  - Drag-and-drop component placement
  - Automatic placement of nozzles and jumpers
  - Common libraries between diagram and 3D
  - Real-time connectivity validation
  - Diagrams drive 3D routing
- Customer Benefit
  - Easy diagramming means more time to refine the design
  - Ensure quality by verifying correct connectivity and equipment from concept to manufacturing
  - Easily create 3D routing from a verified design

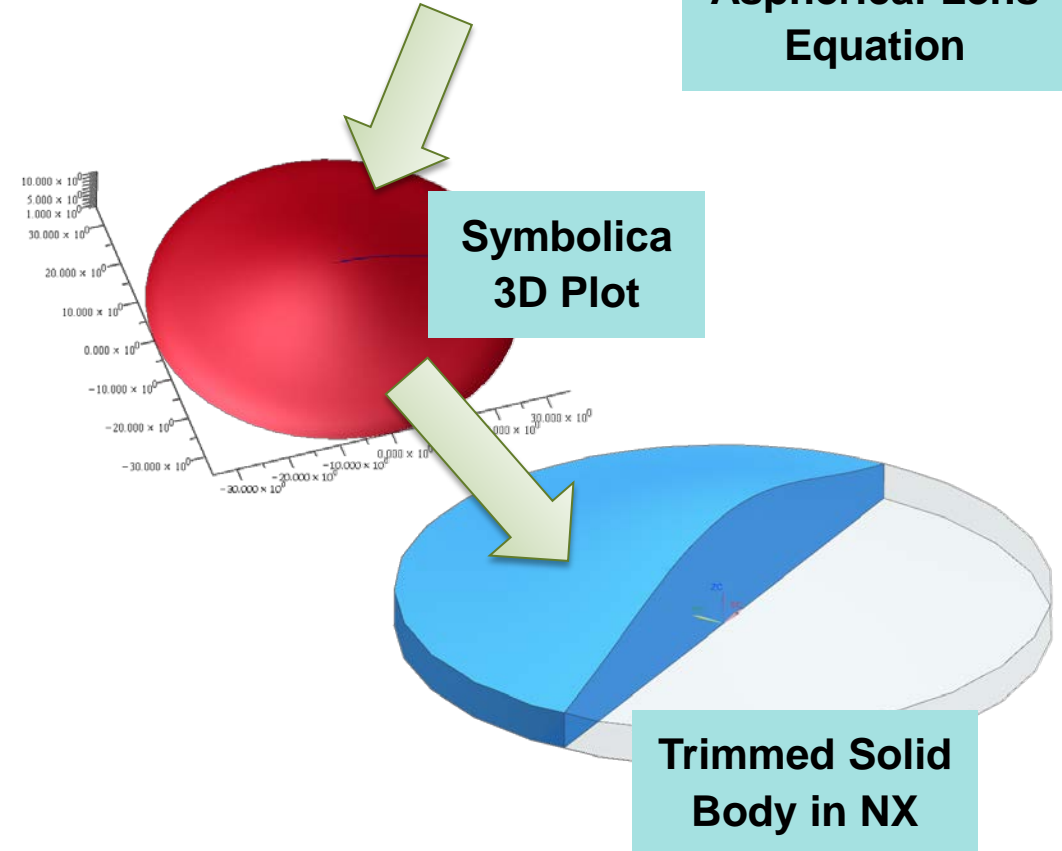


# Process Automation

- Capability
  - Bi-directional integration with Maple or Symbolica
  - Extract a 3D plot as convergent geometry while maintaining associativity
  - Simpler measurement commands
- Customer Benefit
  - Very powerful math-based engineering tools
  - Equation-driven shapes with no deviations
  - More options with improved usability

$$Z := \frac{x^2}{r \cdot \left( 1 + \sqrt{1 - (1 + K) \cdot \left( \frac{x}{r} \right)^2} \right)} + A4 \cdot x^4 + A6 \cdot x^6 + A8 \cdot x^8 + A10 \cdot x^{10} + A12 \cdot x^{12}$$

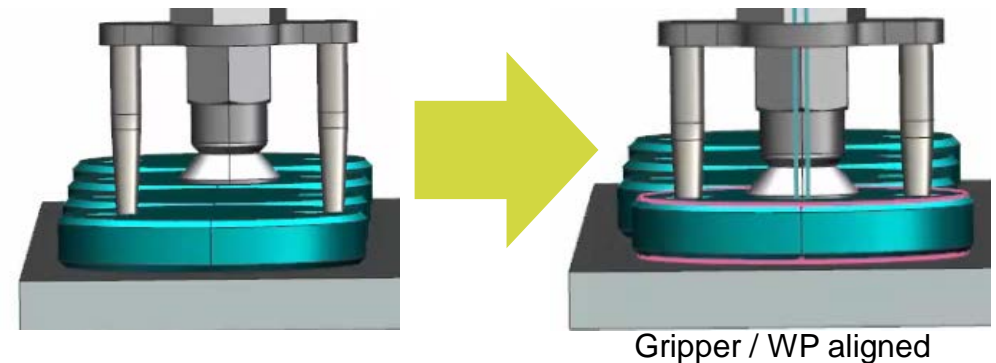
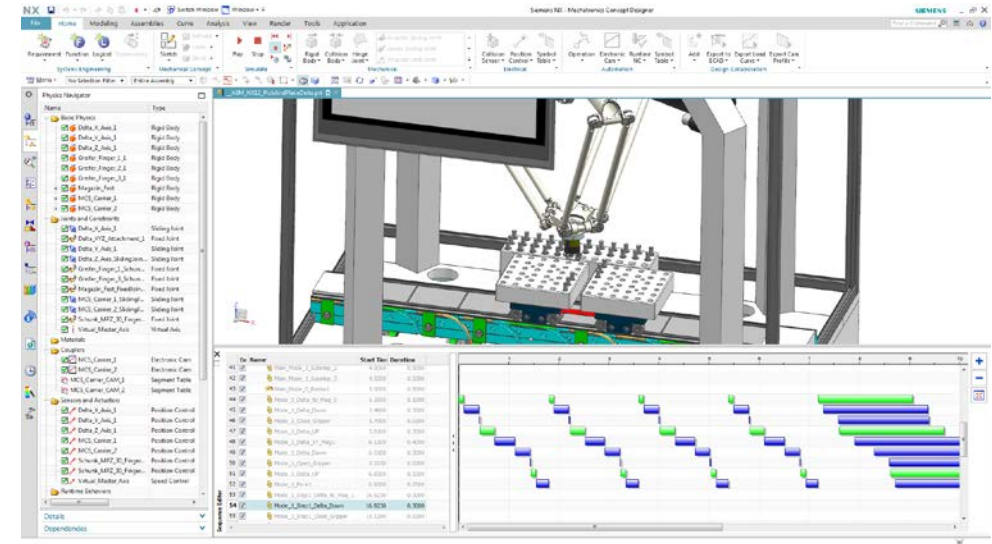
**Aspherical Lens  
Equation**



# Mechatronics Concept Designer

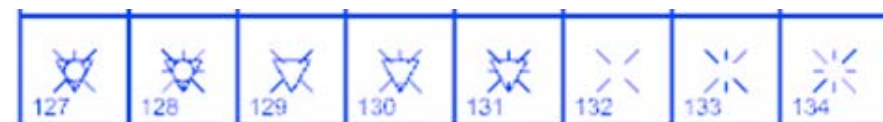
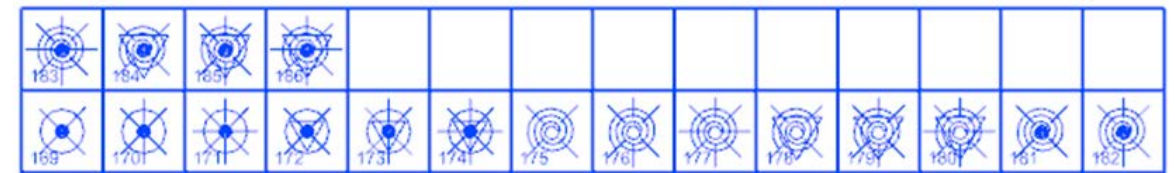
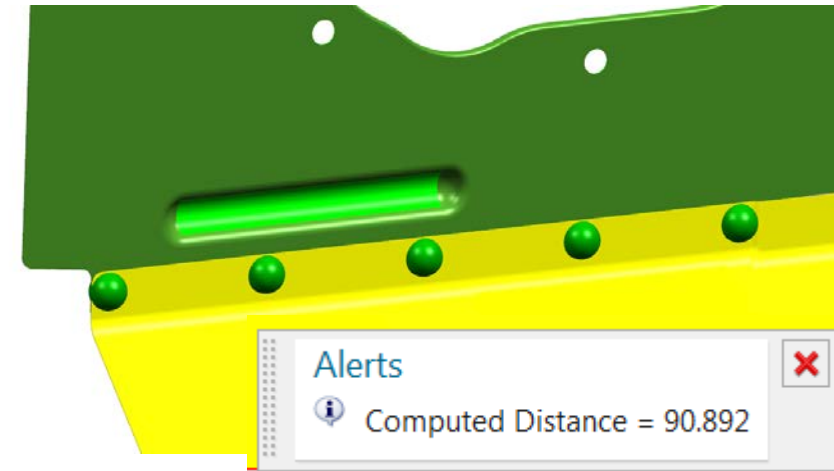


- Capability
  - Mechatronics Collaboration Structure
  - Operations controlled by Timeline
  - Support for tool chain magazines
  - Align body feature
  - Kinematics and mechanical improvements
  - Added runtime interfaces
- Customer Benefit
  - Easy cross-domain collaboration
  - Common interface makes it easy to learn
  - Easier modeling and simulation of machines
  - Improved third-party device connectivity



# Joining and Welding

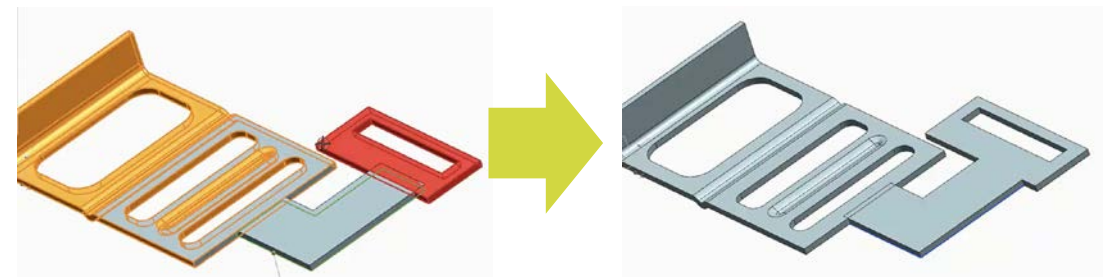
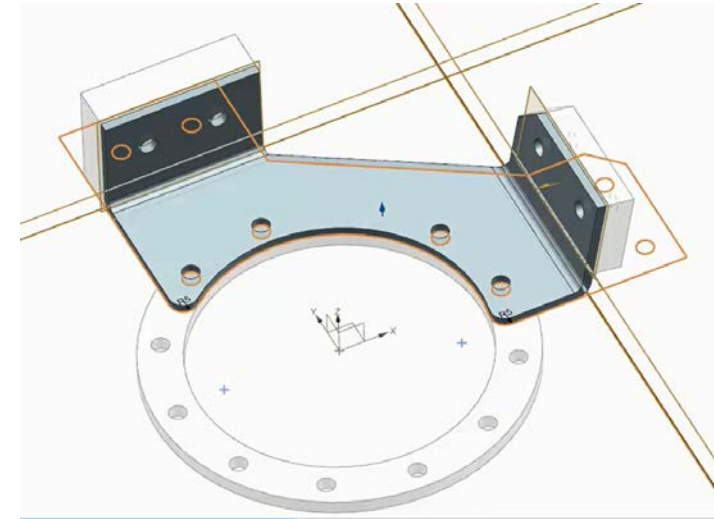
- Capability
  - Position independent links for weld joint types
  - Minimum distance spacing option
  - Transform more types of arc welds
  - Feature group creation
  - More marker symbols
- Customer Benefit
  - Increased automation saves time
  - Improved clarity and fewer errors





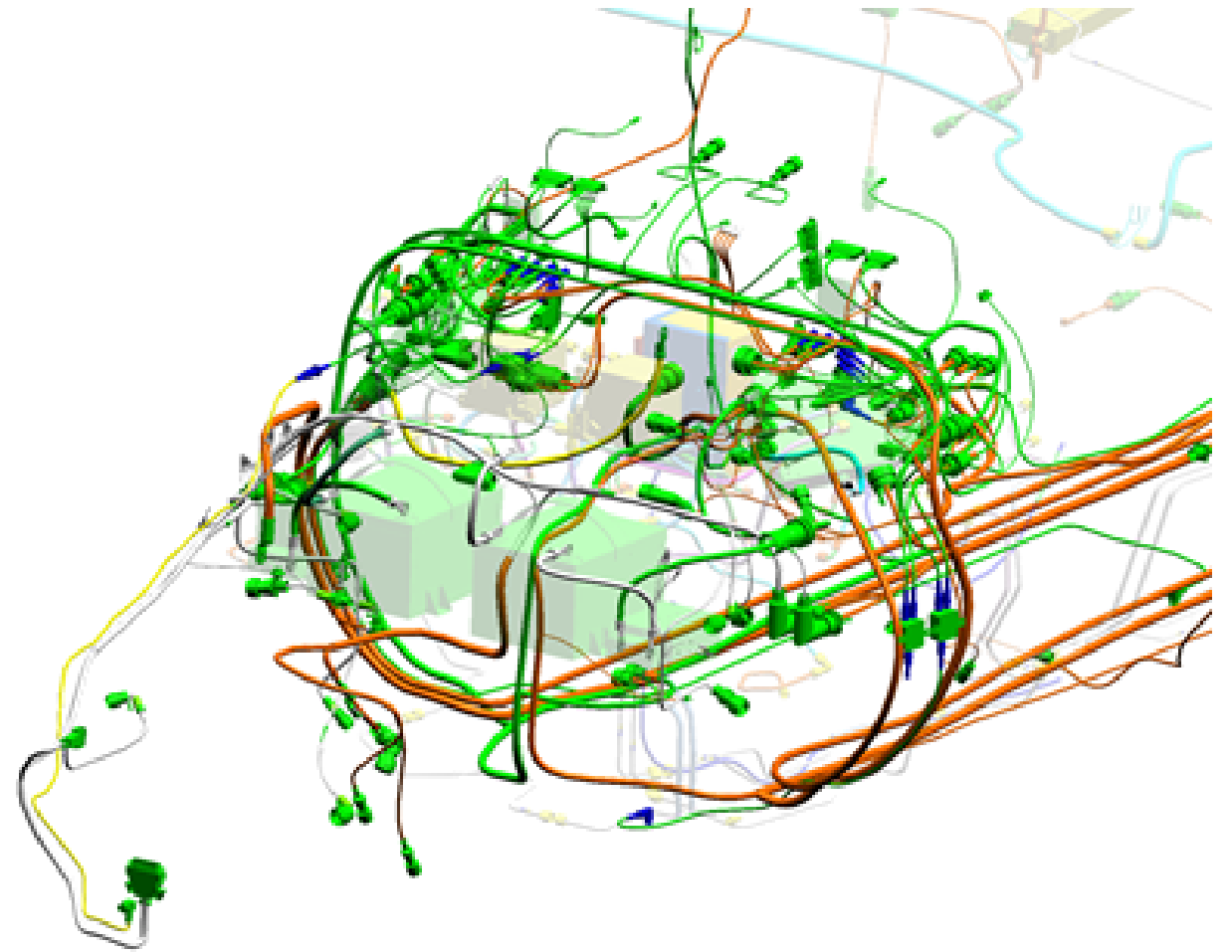
# Sheet Metal

- Capability
  - More flat pattern creation options
  - Convert to sheet metal enhancements
  - Multi-edge flange
  - Multi-profile and multi-bend tab
  - Material and bend table improvements
  - Renew feature
- Customer Benefit
  - Improved performance and efficiency
  - More flexibility and workflow options
  - Reduced feature count improves performance
  - Increased automation saves time and reduces errors



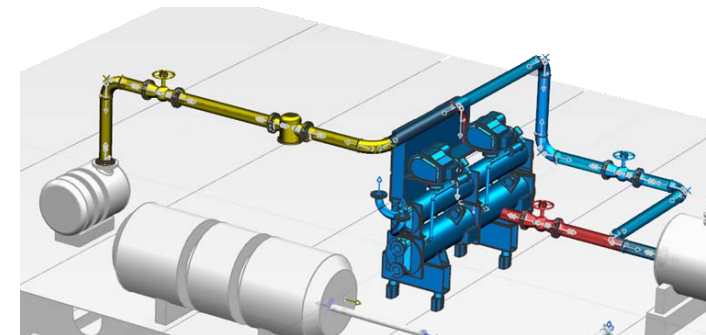
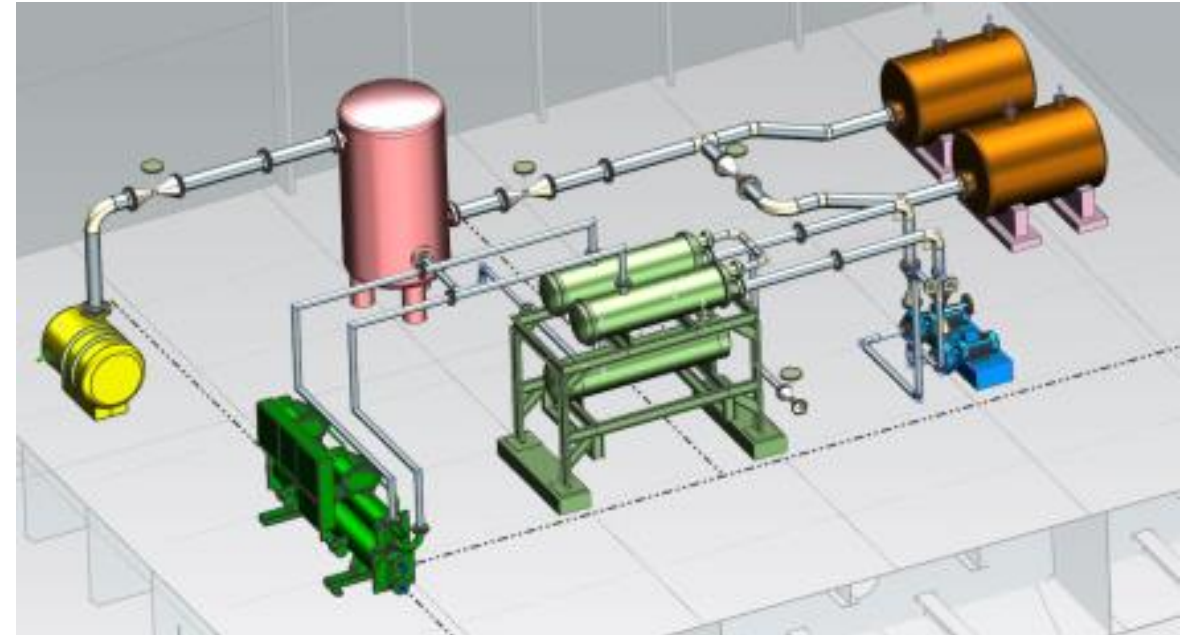
# Routing

- Capability
  - Attribute management
  - Spline path definition
  - Bend radius table
  - Place multiple elbows
- Customer Benefit
  - Better access to important information
  - Easier maintenance of standard parts
  - More control of spline paths
  - Standardized configuration saves time
  - Support for downstream use



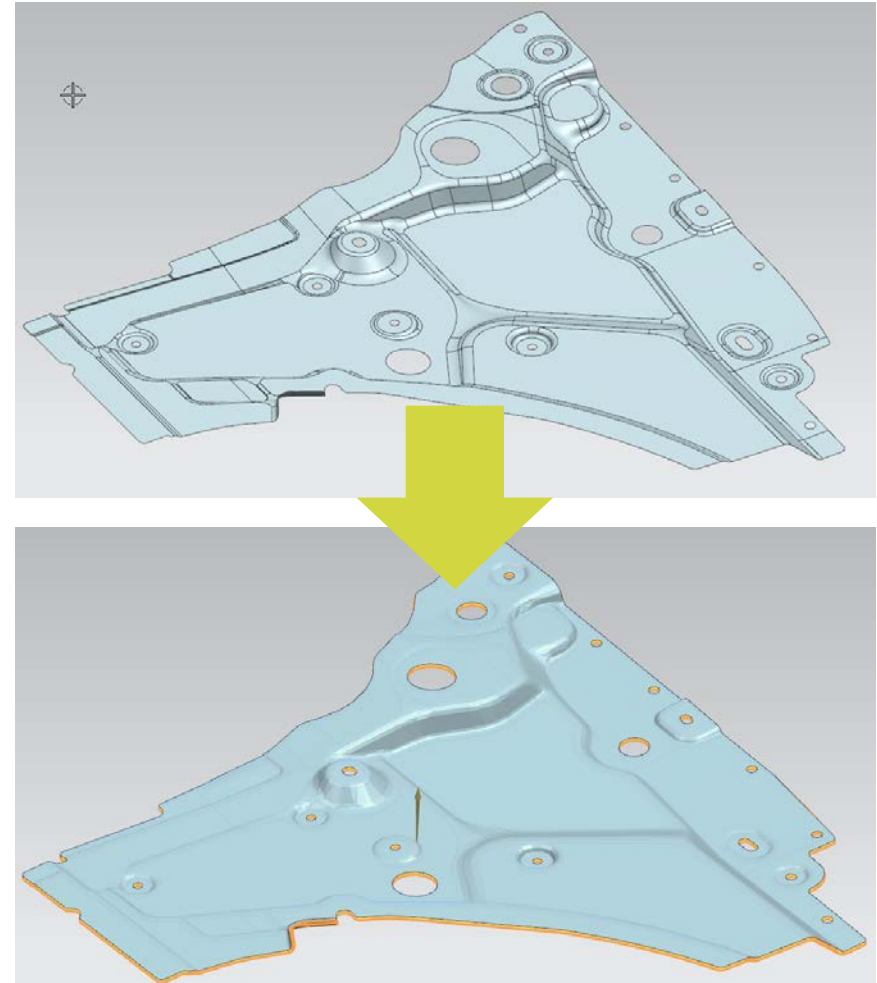
# Next Generation Routing

- Capability
  - Creation workflow
  - Change workflow
  - Cut elbows
  - Bulk replacement
- Customer Benefit
  - More productive
  - Improved feedback
  - Reduced rework and duplication
  - More control and ease of use



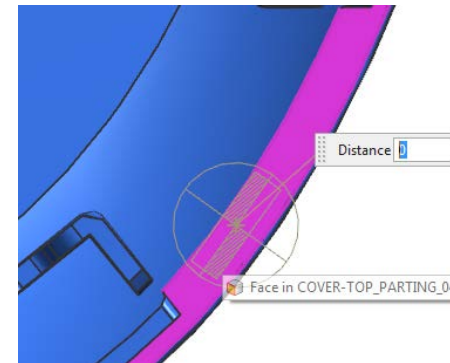
# Tooling Design

- Capability
  - Feature2Cost identifies features for cost calculation
  - Rough offset improvements
  - Usability improvements
- Customer Benefit
  - Quickly determine manufacturing costs
  - Improved surface quality with full associativity
  - More efficient workflows with less manual entry



# Tooling Design Mold Wizard

- Capability
  - Improved attribute reuse
  - Ejector pin configuration during creation
  - Improved automation in cooling design
  - Faster mold base and electrode design changes
  
- Customer Benefit
  - Improved consistency between design and manufacturing
  - Improved productivity with a single-source solution
  - Elimination of manual steps saves time



UM_PROD_LIST	v0
UM_PRODUCT_MATERIAL	ABS
UM_PROJECT	v0
UM_SHRINK_VALUE	1.006
UM_SORT_MODE	0 0 -1 -1
UM_TOP	1

CUSTOMER	Customer2
DATE	4/19/2017
DESCRIPTION_1	DESCRIPTION_1
DESCRIPTION_2	DESCRIPTION_2
DESIGNER	ugse8m

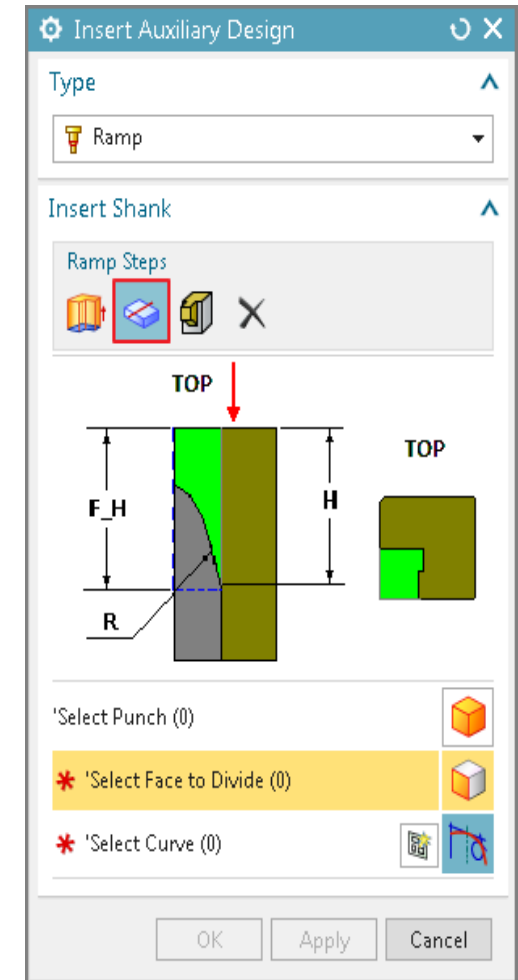
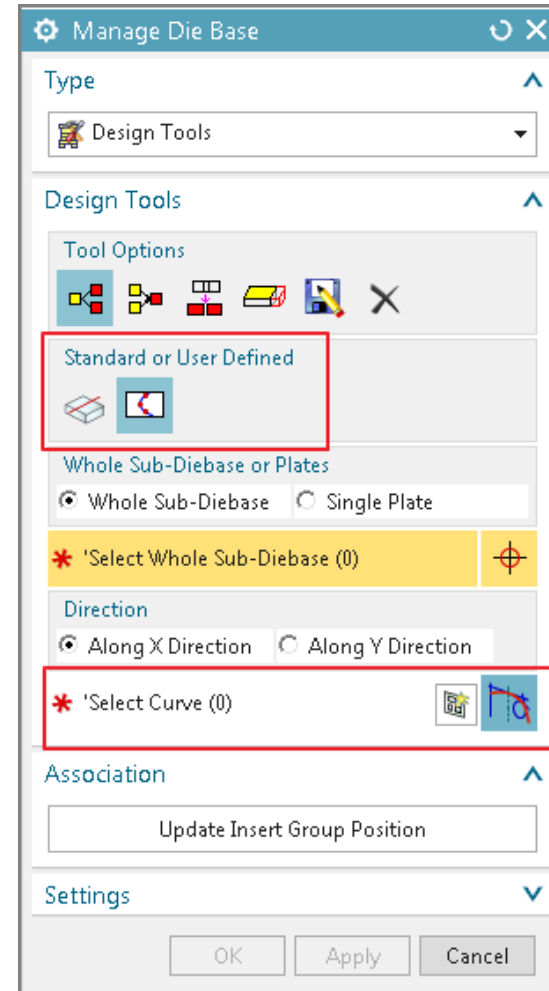
Attributes

Name	Value
CUSTOMER	Customer1
DESIGNER	Customer1
PROJECT_NUM...	Customer2
PROJECT_DESC...	Customer3

# Tooling Design

## Progressive Die Wizard

- Capability
  - Split Inserts into smaller pieces
  - Die Base Design
  - Define Intermediate Stages
  - More robust ramp creation
- Customer Benefit
  - Increased automation saves time
  - Reduced errors through downstream use

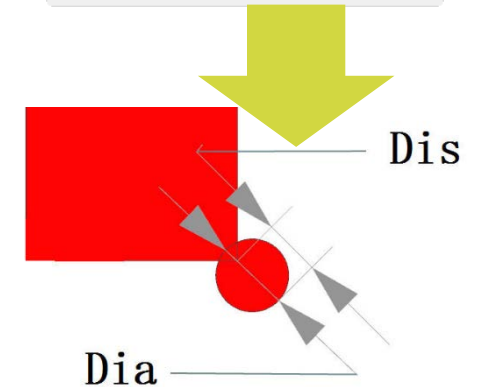
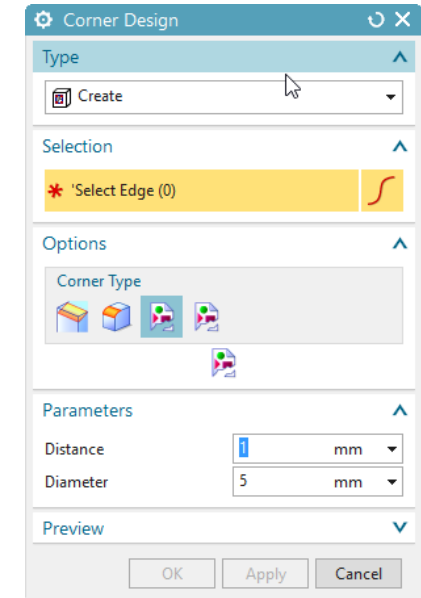
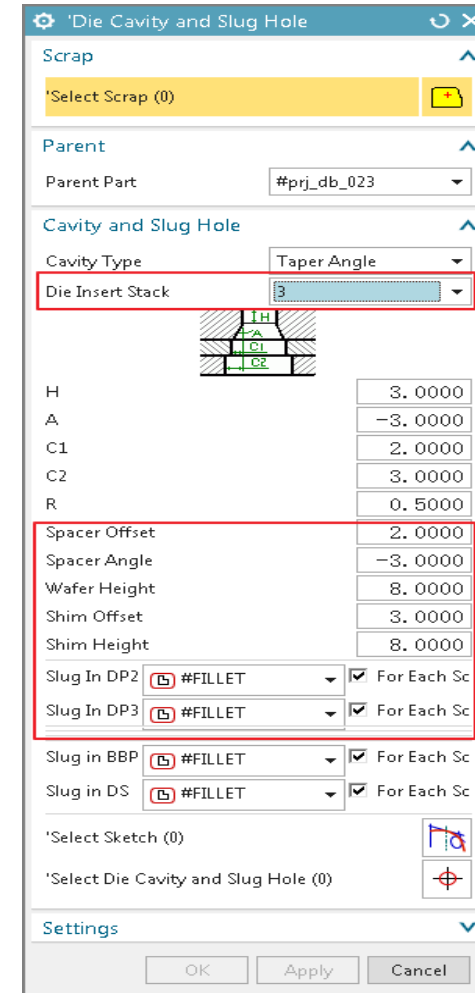




# Tooling Design Progressive Die Wizard

- Capability
  - More punch insert options
  - New templates for Die Cavity and Slug Hole
  - Scrap length and width display
  - New corner design options
  - Forming and naming improvements
- Customer Benefit
  - More options to support more workflows
  - Reduced errors through downstream use

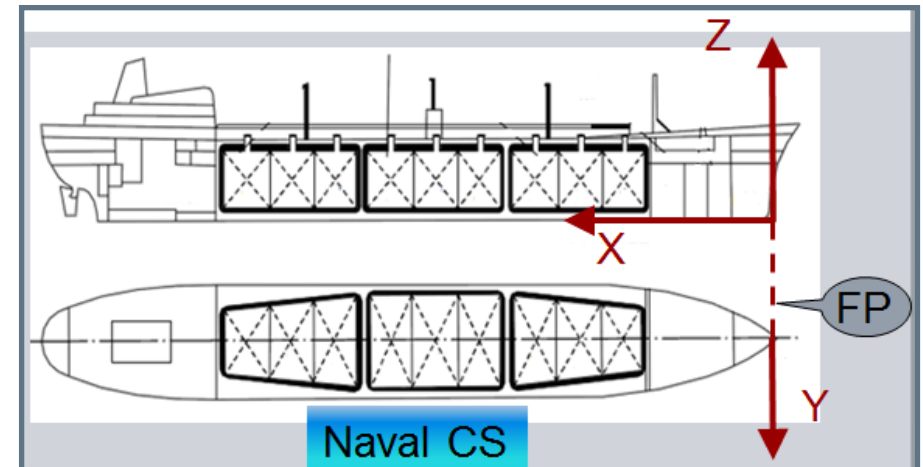
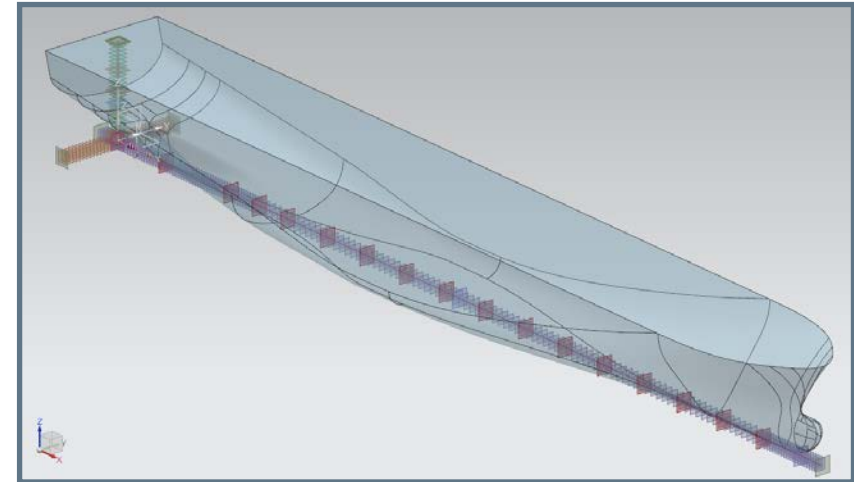
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# Marine Design

## Ship Structure Enhancements

- Capability
  - Project setup
  - Grid
  - Shipbuilding performance
  - Coordinate systems
- Customer Benefit
  - Faster project start up
  - Simplified display for better understanding
  - Improved performance and responsiveness
  - Improved compliance with industry standards

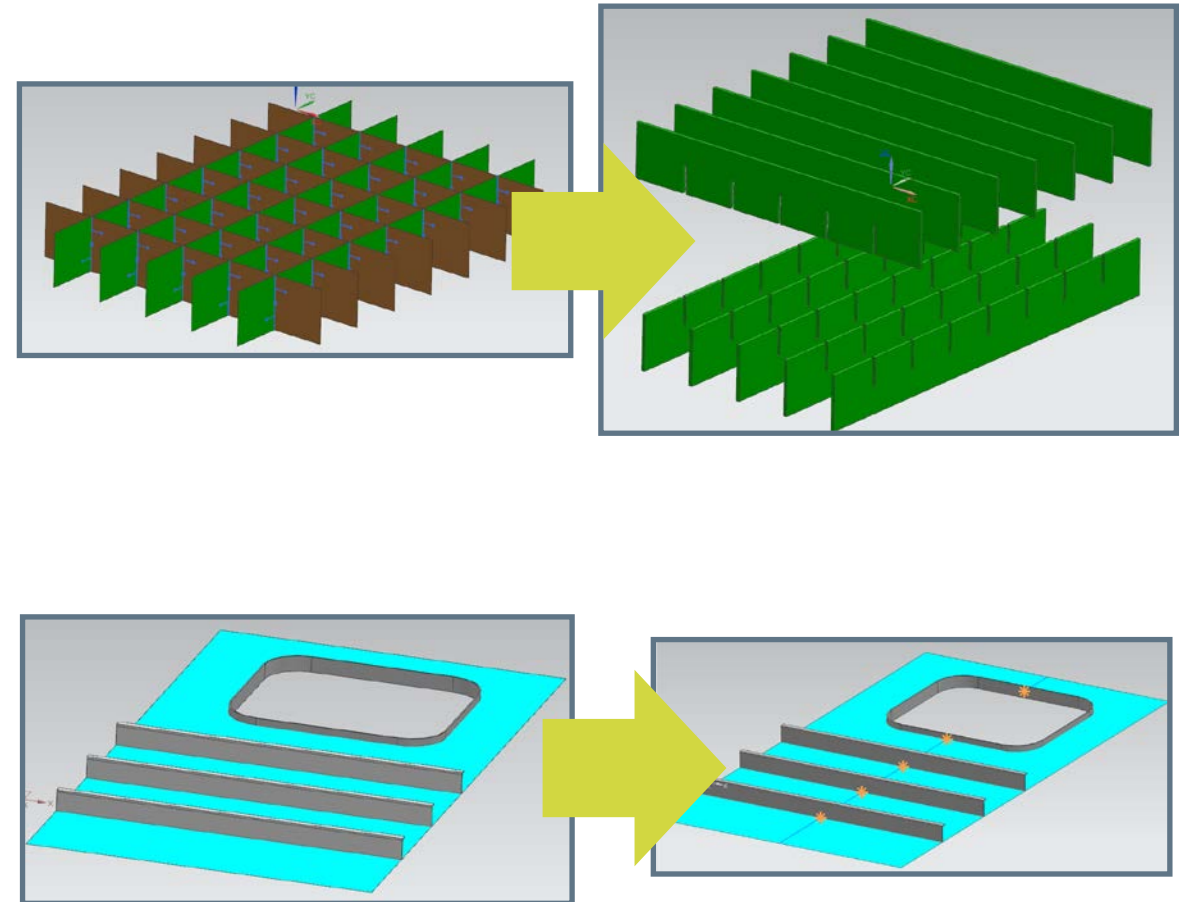


# Marine Design

## Ship Structure Basic Design

- Capability
  - Copy and Seam enhancements
  - Stiffener system boundary
  - Corner and edge cuts
  - Transitions
- Customer Benefit
  - More efficient and versatile workflows
  - Clearer communication reduces errors
  - Improved validation ensures quality

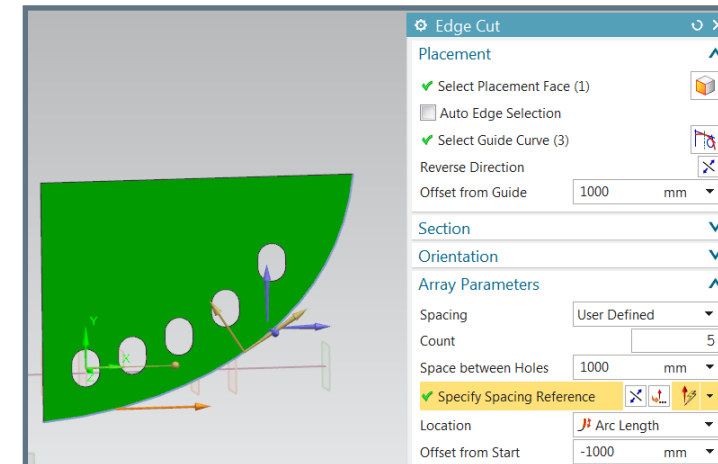
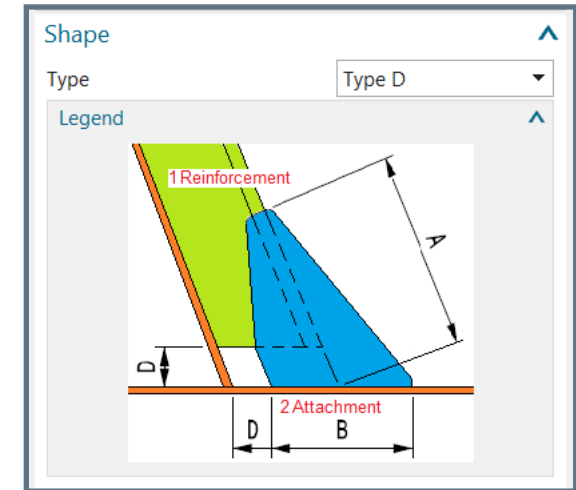
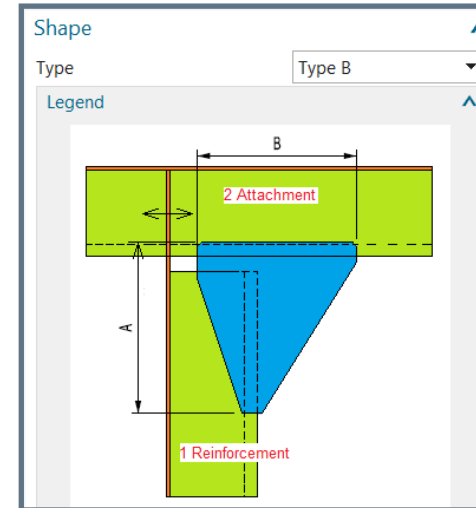
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# Marine Design

## Ship Structure Basic and Detail Design

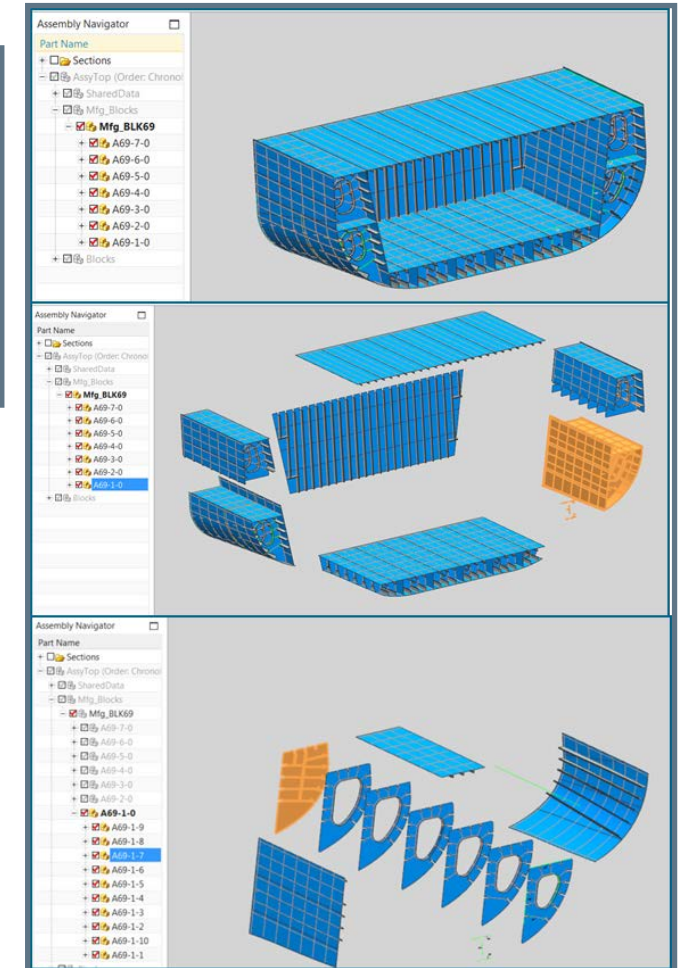
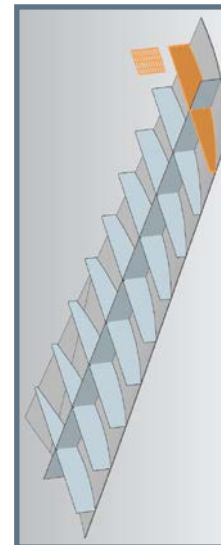
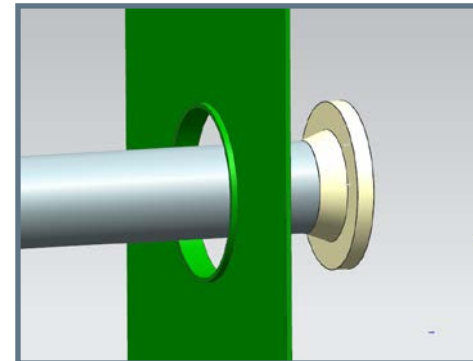
- Capability
  - Cutouts
  - Drawings
  - Lapped bracket
- Customer Benefit
  - More efficient and versatile workflows
  - Clearer communication reduces errors



# Marine Design

## Ship Structure Detail Design

- Capability
  - Detail design split
  - Penetration management
  - Manufacturing assemblies
  - Plate bending template
- Customer Benefit
  - More efficient and versatile workflows
  - Clearer communication reduces errors



# What's New in NX 12 CAD Topics



**Modeling**

Easier to use with more control and options than ever

**Process-Specific Design**

More efficient and versatile workflows

**MBD and Drafting**

More flexibility and improved downstream use

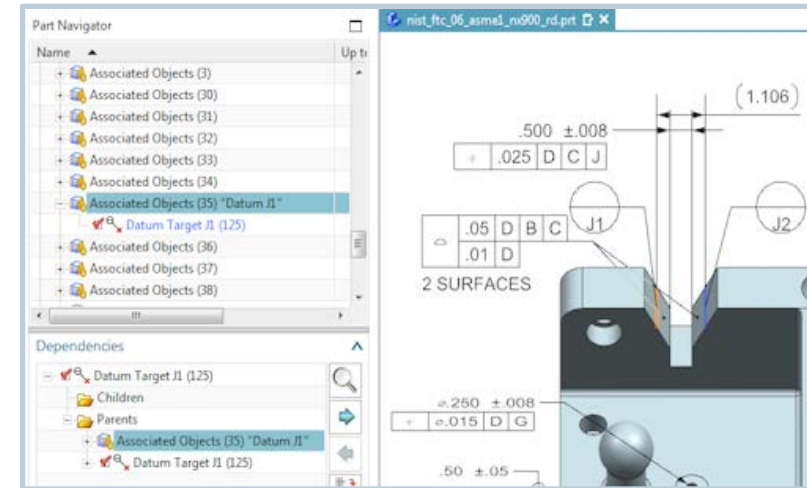
**Teamcenter Integration**

**User Experience**



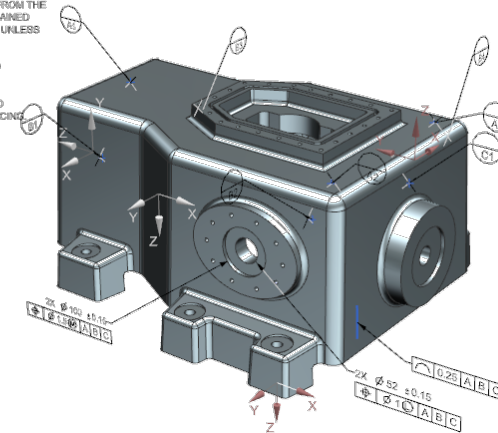
# Model Based Definition Usability Enhancements

- Capability
  - Navigator enhancements
  - Parallel to screen
  - Multiple Display Parts
- Customer Benefit
  - Improved downstream tracking reduces errors
  - Easier to interpret PMI on screen
  - More freedom to work the way you want



NOTES (UNLESS OTHERWISE SPECIFIED):

1. OBTAIN DIMENSIONS FOR ALL UNDIMENSIONED FEATURES FROM THE MODEL. ALL DIMENSIONS OBTAINED FROM THE MODEL ARE BASIC UNLESS OTHERWISE SPECIFIED.
2. ASME Y14.41-2003 APPLIES TO DATASET.
3. ASME Y14.5M-1994 APPLIES TO DIMENSIONING AND TOLERANCING.



# Model Based Definition Functionality Enhancements

- Capability
  - PMI Table
  - Bolt circle centerline
  - Suppress PMI object
- Customer Benefit
  - Support for drawingless initiatives
  - More control over annotation enables more workflows

26.3 HEIGHT

28 OFFSET

250 OUTER DIAMETER

6.4 THICKNESS

New Table

Edit Table

UNLESS SPECIFIED OTHERWISE, ALL DIMENSIONS ARE IN MM. TOLERANCES +0.2MM

DATUM TABLE	
DATUM	DESCRIPTION
A	MOUNTING FACE
F	SPINDLE BASE DIAMETER

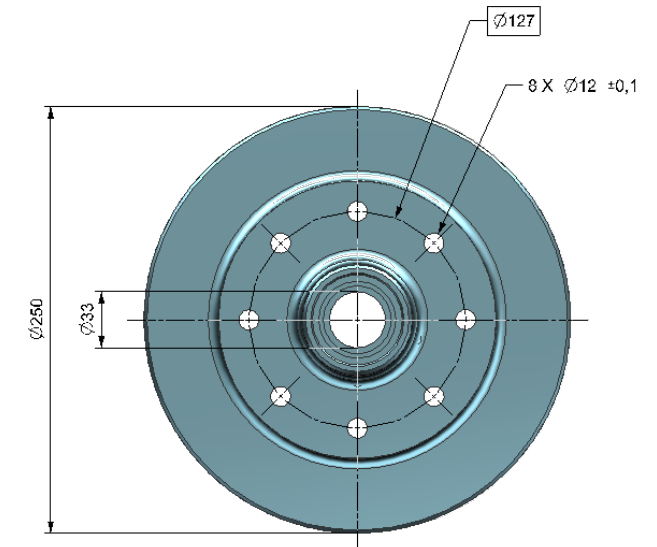
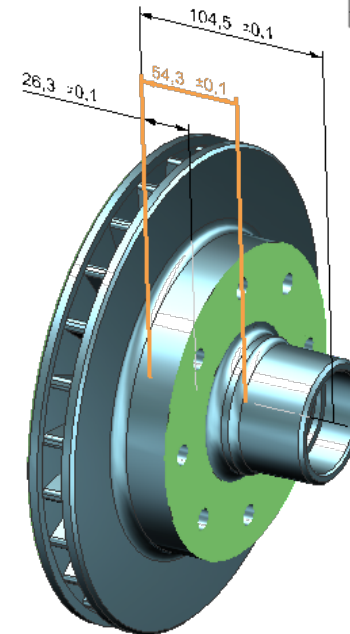
ROTOR SPECIFICATIONS			
TYPE	SPLM 2000	SPLM 2500 (AS SHOWN)	SPLM 3000
OUTER DIAMETER	200 mm	250 mm	300 mm
HEIGHT	25.8 mm	26.3 mm	26.8 mm
THICKNESS	6 mm	6.4 mm	7 mm
OFFSET	25 mm	28 mm	30 mm
STUD BOLT SIZE	12.6mm	12.7 mm	
STUD BOLT CIRCLE	8 X 138 mm		
WEIGHT	6.6 kg	7.9 kg	8.5 kg

# Model Based Definition

## Convert to PMI Enhancements

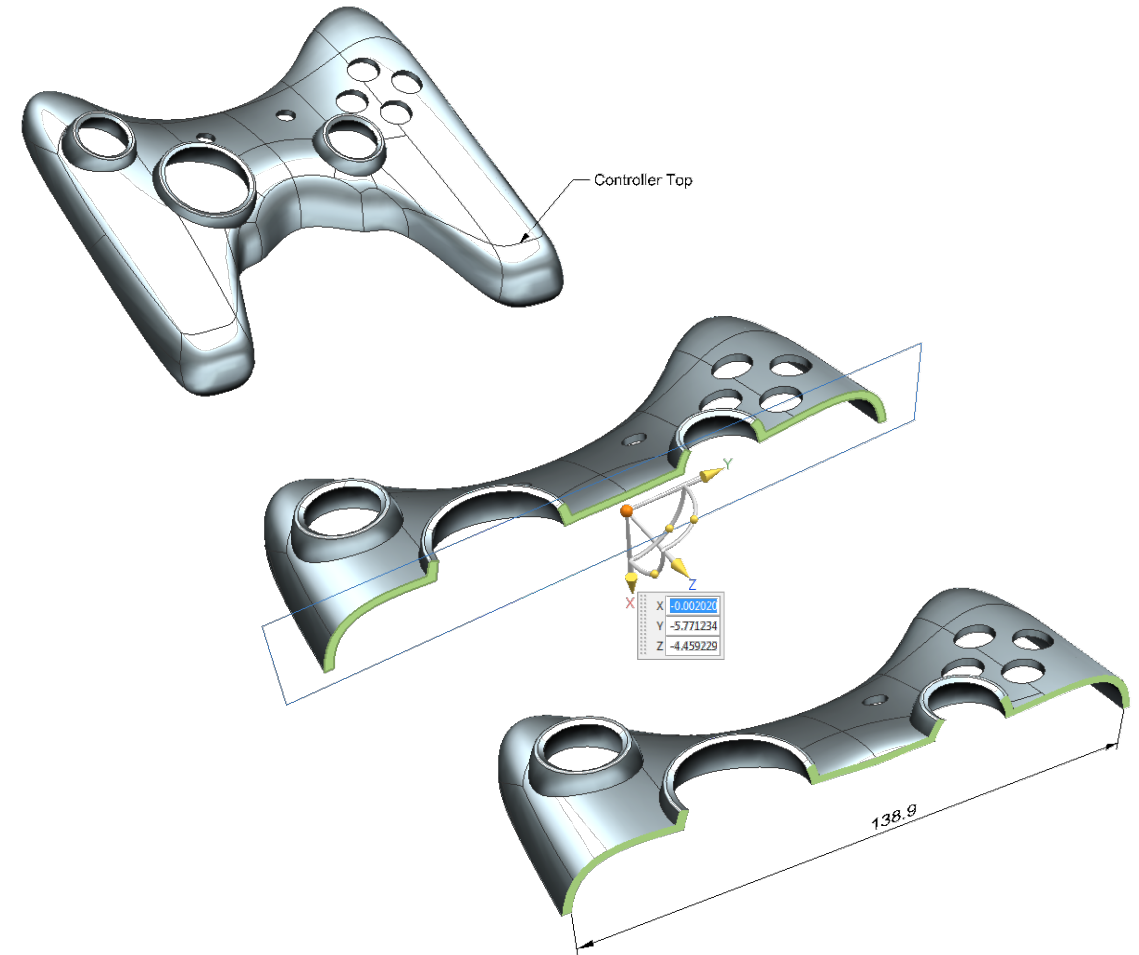
- Capability
  - Automatically convert drawings and views to PMI
  - Additional object support
  - Enhanced workflows
  - Drafting annotation support
- Customer Benefit
  - Easier to leverage legacy data
  - Take advantage of downstream processes
  - More freedom to work the way you want

ROTOR SPECIFICATIONS			
TYPE	SPLM 2000	SPLM 2500 (AS SHOWN)	SPLM 3000
OUTER DIAMETER	200 mm	250 mm	300 mm
HEIGHT	25.8 mm	26.3 mm	26.8 mm
THICKNESS	6 mm	6.4 mm	7 mm
OFFSET	25 mm	28 mm	30 mm
STUD BOLT SIZE	12.0mm	12.6 mm	12.5 mm
STUD BOLT CIRCLE	8 X 120 mm	8 X 127 mm	8 X 130 mm
WEIGHT	6.6 kg	7.8 kg	8.5 kg



# Model Based Definition and Drafting Interoperability Enhancements

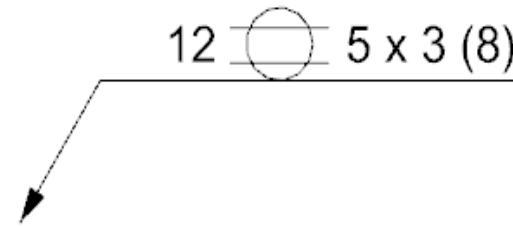
- Capability
  - Convergent bodies
  - Minimally loaded assemblies
- Customer Benefit
  - Get from concept to production faster
  - Improved system performance



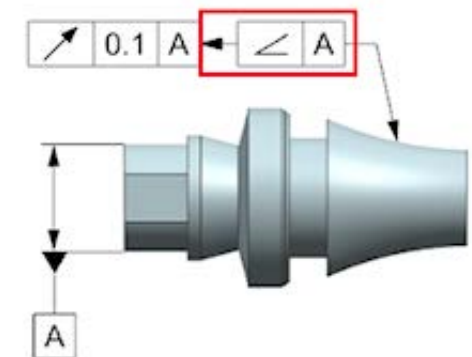
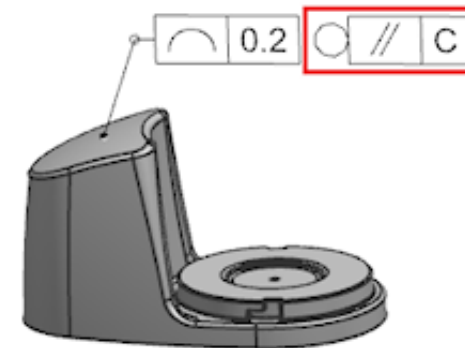
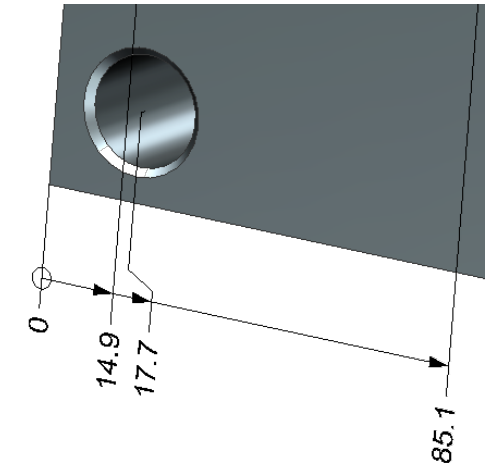
# Model Based Definition and Drafting

## Dimensioning and Annotation Enhancements

- Capability
  - Dimensioning
  - Feature control frames
  - Weld symbols
- Customer Benefit
  - More flexibility and better downstream use
  - Improved standards compliance

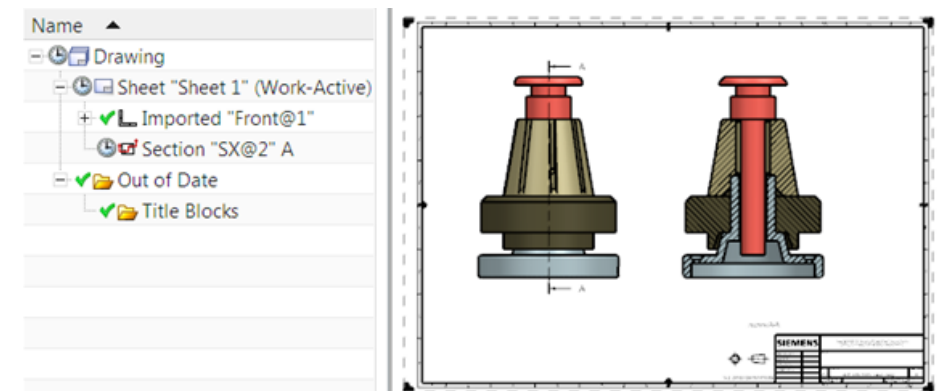
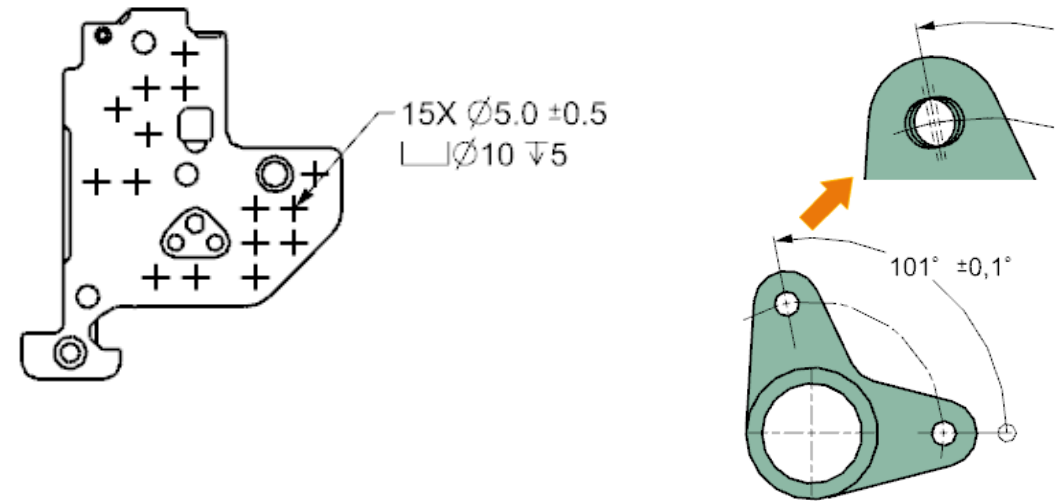


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# Drafting

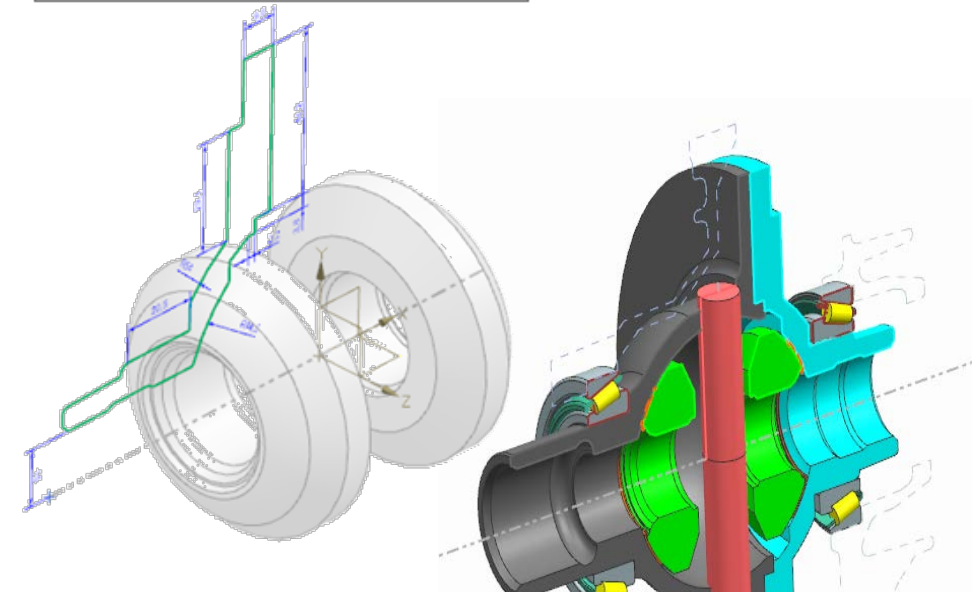
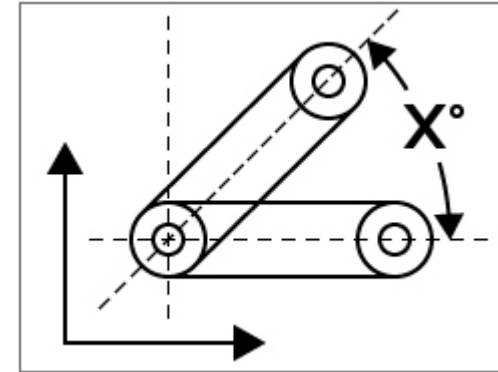
- Capability
  - Include model curves
  - Section component attribute
  - Angular directed dimension
- Customer Benefit
  - More flexible and easier to use
  - Easier information capture reduces errors





# NX Layout

- Capability
  - NX Layout now it's own application
  - No need for drafting sheets
  - Improved component placement
- Customer Benefit
  - Streamlined workflows save time
  - More freedom to work the way you want



# What's New in NX 12 CAD Topics



**Modeling**

Easier to use with more control and options than ever

**Process-Specific Design**

More efficient and versatile workflows

**MBD and Drafting**

More flexibility and improved downstream use

**Teamcenter Integration**

Deeper collaboration and integration

**User Experience**

# Teamcenter Integration



- Capability
  - Intelligent Save
  - NX Environments
  - Publishing Model Views
- Customer Benefit
  - Logical save process addresses business needs
  - Broader NX version support in Teamcenter
  - Improved collaboration with non-NX users

Current State		Decision		End State					
ID	Revision	Name	Reason	Action	ID	Revision	Name	Pro	
1	006320	A	006320	Released	Revise	006320	* Double...	006320	
2	006321	A	006321	Released	Ignore	N/A	N/A	N/A	N/A
3	GTE001194	B	GTE001194	Released	Ignore	GTE001194	* Double...	GTE001194	

ID	Revision	Name	Reason	Action	ID	Revision	Name	Pro
GLX_409668_A/A;1-Nylon Bushing Assembly								
GLX_409651_A/A;1-Tool Combo								
GLX_409663_A/A;1-Fuel & Chain Oil Assembly								
GLX_409685_A/A;1-Electrical Assembly								
GLX_409633_A/A;1-Chain & Bar Assemblies								
GLX_409779_A/A;1-Housing & Coverings Asse...								
CMN_409753_A/A;1-Engine COMMON top ass...								
CMN_409695_A/A;1-Muffler assembly								
CMN_409680_A/A;1-Sprocket Assembly								
CMN_409696_A/A;1-Carburetor Assembly								
CMN_409752_A/A;1-Cylinder/Piston Assem...								
CMN_409681_A/A;1-carbuertor to cylinder a...								
CMN_409701_A/A;1-AIR FILTER								

Part is from Common environment which does not match with current environment.

# Teamcenter Integration

- Capability
  - LOV support
  - Precise structure column
  - Multiple item naming patterns
  - Dataset naming pattern
- Customer Benefit
  - Defining Teamcenter properties in NX saves time
  - Improved customer workflow support

Assembly Navigator □

Object ▲	M	M...	Precise Structure
[-]  Sections			
[-] <b>409753_Idaho/A;1-Engine Assembly (Order: Chronological)</b>	✓		
+  409695_Idaho/A;1-Muffler assembly	✓		
[-]  409680_Idaho/A;1-Sprocket Assembly	✓		⊙
409693_Idaho/B;1-sprocket	✓		⊙
[-]  409768_Idaho/A;1-Ass-clutch	✓		⊙
409770_Idaho/A;1-clutch1	✓		⊙
409792_Idaho/A;1-clutch2	✓		⊙
409697_Idaho/A;1-clamp2	✓		⊙
409782_Idaho/A;1-Spring	✓		⊙
409770_Idaho/A;1-clutch1	✓		⊙
409770_Idaho/A;1-clutch1	✓		⊙
409697_Idaho/A;1-clamp2	✓		⊙
409697_Idaho/A;1-clamp2	✓		⊙
409782_Idaho/A;1-Spring	✓		⊙
409782_Idaho/A;1-Spring	✓		⊙
+  409696_Idaho/A;1-Carburetor Assembly	✓		
+  409752_Idaho/A;1-Cylinder/Piston Assembly	✓		
+  409681_Idaho/A;1-carbuertor to cylinder assy	✓		
409701_Idaho/A;1-AIR FILTER	✓		
409757_Idaho/A;1-AIR CLEANER HOUSING - CARBURETOR SIDE	✓		
409767_Idaho/A;1-Linkage_90mm	✓		

# Teamcenter Integration

- Capability
  - Multi-CAD import and export
  - Group and role changes inside NX
  - Displayed templates for item types
- Customer Benefit
  - Defining Teamcenter properties in NX saves time
  - Improved supplier collaboration
  - Simplified interface saves time and reduces errors

**Assembly Navigator**

Object	R...	Multi-CAD	So...
[-] <input checked="" type="checkbox"/> imp1-assembly/A;1 (Order: New Order 1)	A		im...
[-] <input checked="" type="checkbox"/> imp1-support-assy/A;1	A		imp...
[-] <input checked="" type="checkbox"/> imp1-support_bracket_rhs/A;1 x 2	A		imp...
[-] <input checked="" type="checkbox"/> imp1-support-bracket/A;1 x 2	A		imp...
[-] <input checked="" type="checkbox"/> imp1-support-base/A;1 x 2	A		imp...
[-] <input checked="" type="checkbox"/> imp1-spring-flex/A;1 x 2	A		imp...
[-] <input checked="" type="checkbox"/> imp1-small_connector/A;1 x 4	A		imp...
[-] <input checked="" type="checkbox"/> imp1-mount-block/A;1 x 2	A		imp...
[-] <input checked="" type="checkbox"/> imp1-hose-10-400-2a-flex/A;1 x 2	A		imp...

Select Template Part

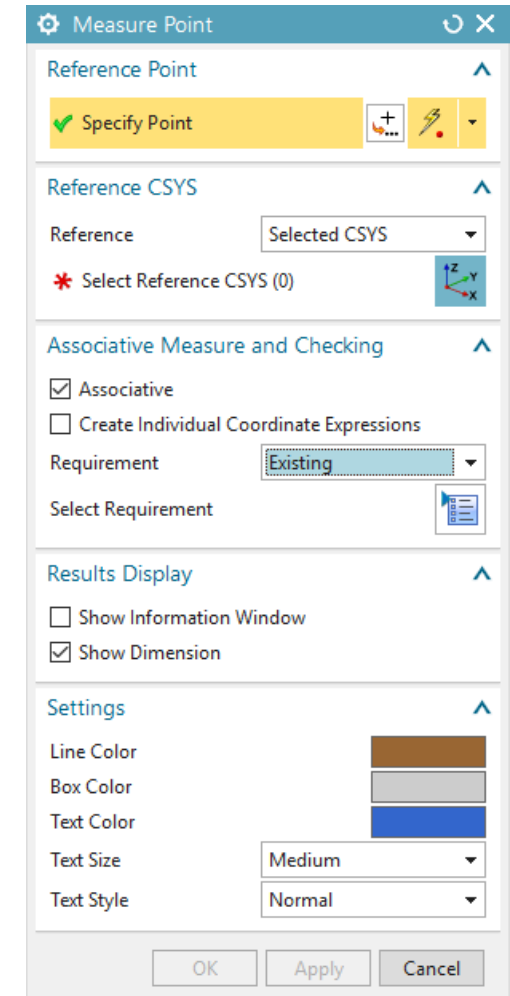
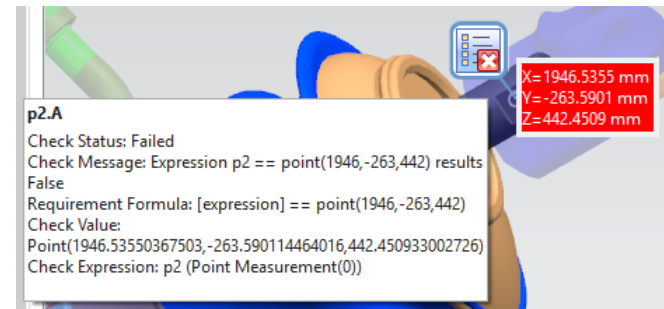
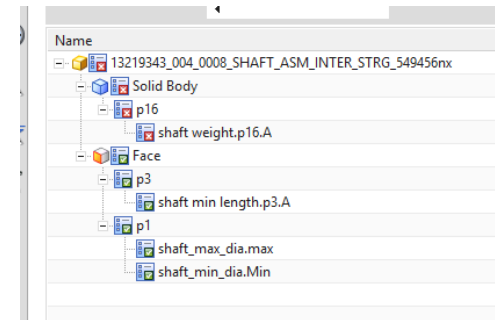
MFK Model | Drawing | Mechatronics Concept Designer | Model

Templates

'Name	'Type	'Units	'Relationship	'Owner	'Item Type
Model	'Modeling	'Millimeters	master	infodba (d...	Item
Assembly	'Assemblies	'Millimeters	master	infodba (d...	Item
Shape Studio	'Shape Studio	'Millimeters	master	infodba (d...	Item
NX Sheet Metal	'Sheet Metal	'Millimeters	master	infodba (d...	Item
Routing Logical	'Routing Logical	'Millimeters	master	infodba (d...	Item
Routing Mechanical	'Routing Mech...	'Millimeters	master	infodba (d...	Item
Routing Electrical	'Routing Electri...	'Millimeters	master	infodba (d...	Item

# Systems Driven Product Development

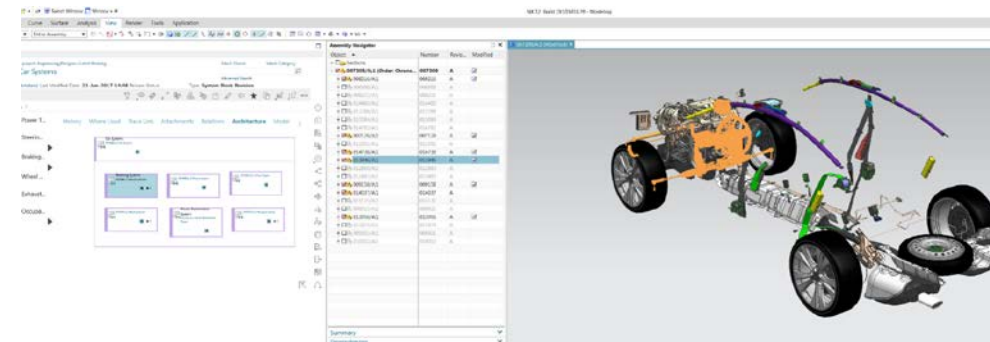
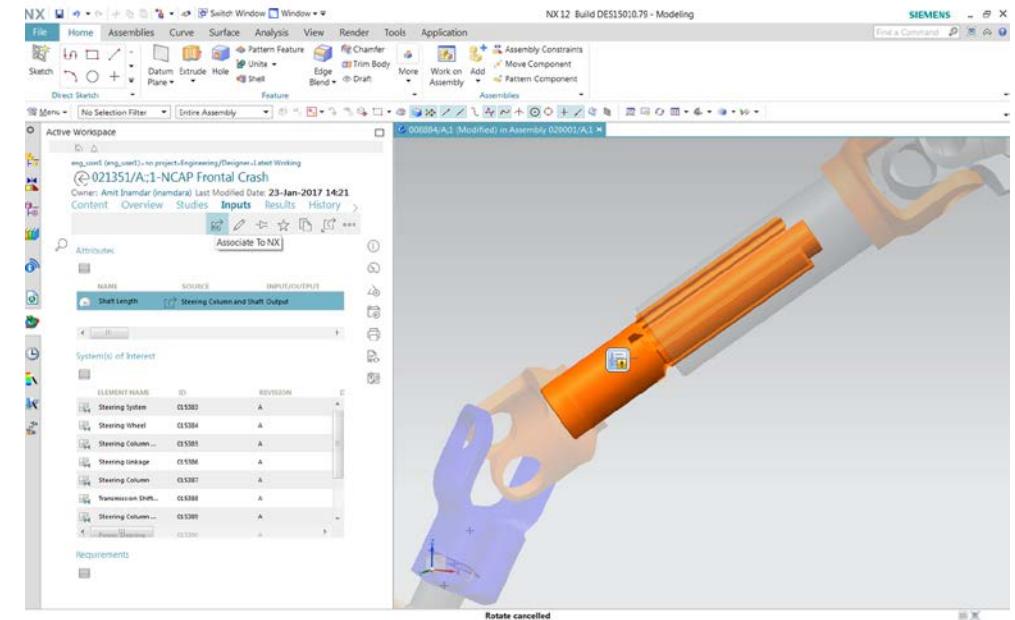
- Capability
  - Requirement check with deviation for points
  - Assembly context point measurements
  - Requirement check in Simcenter results
  - Partial loading validation support
  - Visual report for key performance indicators
- Customer Benefit
  - More precise product definition reduces errors
  - Work in context of product assembly
  - Improved quality by verifying CAE results
  - Faster validation saves time
  - Deeper knowledge of geometry relationships





# Systems Driven Product Development

- Capability
  - Associate expressions to product interfaces
  - Design limit requirements
  - Teamcenter Measurable Attribute association
  - Teamcenter Analysis Request handling
  - Target attributes to NX requirements
  - NX values to measurable attributes
  - Visual logical-physical cross-probing
- Customer Benefit
  - Easier creation of crucial documents
  - Embedded knowledge enables downstream reuse
  - Verify quality with improved relationship and attribute tracking
  - Easier collaboration



# What's New in NX 12 CAD Topics



**Modeling**

Easier to use with more control and options than ever

**Process-Specific Design**

More efficient and versatile workflows

**MBD and Drafting**

More flexibility and improved downstream use

**Teamcenter Integration**

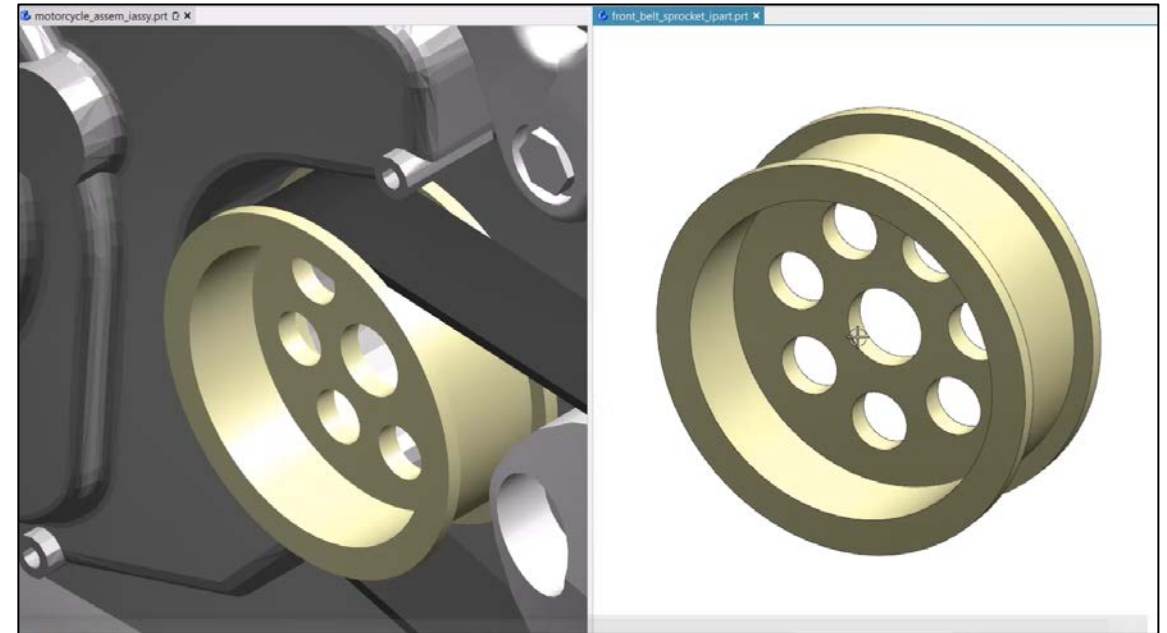
Deeper collaboration and integration

**User Experience**

More efficient and secure than ever

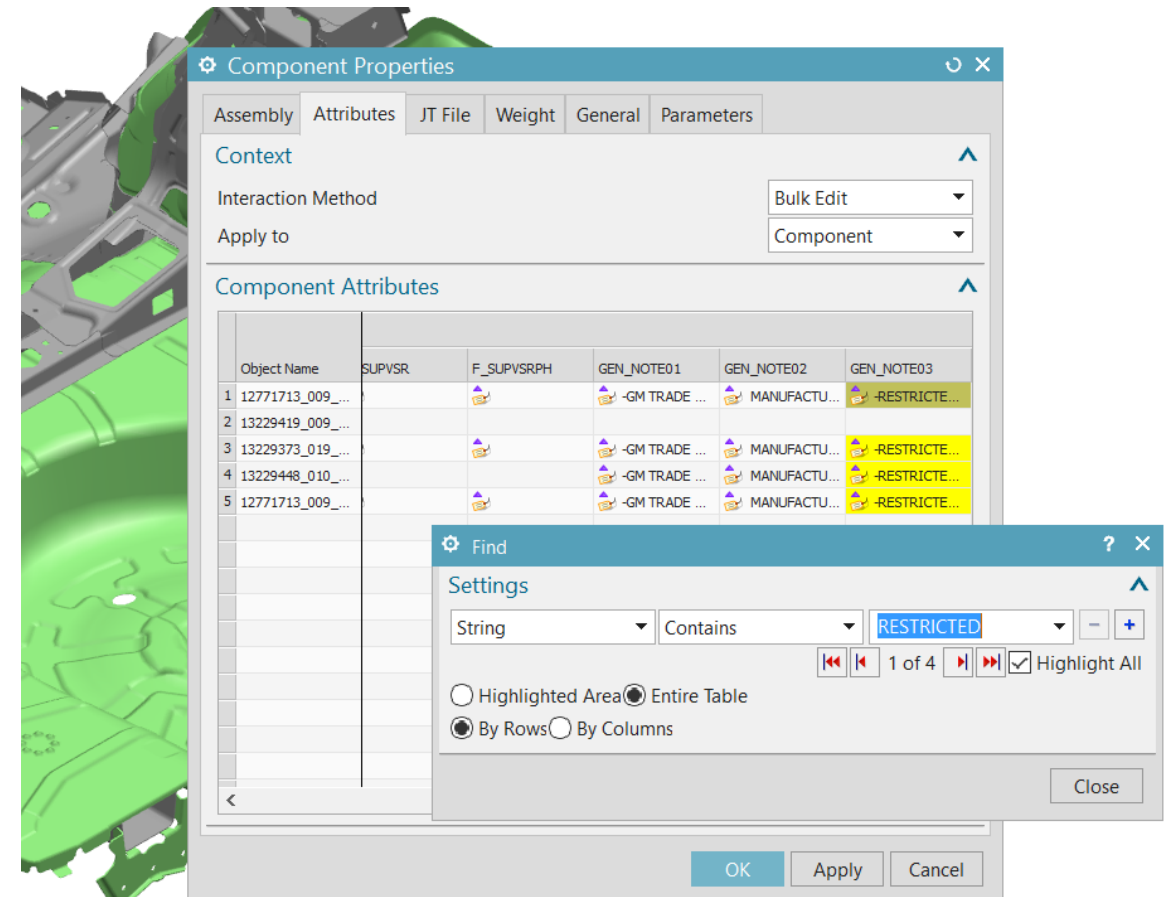
# User Experience

- Capability
  - Multiple Display Parts
  - Tab-based layout for multiple windows
- Customer Benefit
  - Fast, easy switching between parts and applications
  - Easy change impact analysis
  - Easy comparison between parts
  - Efficient use of screen space and multiple monitors



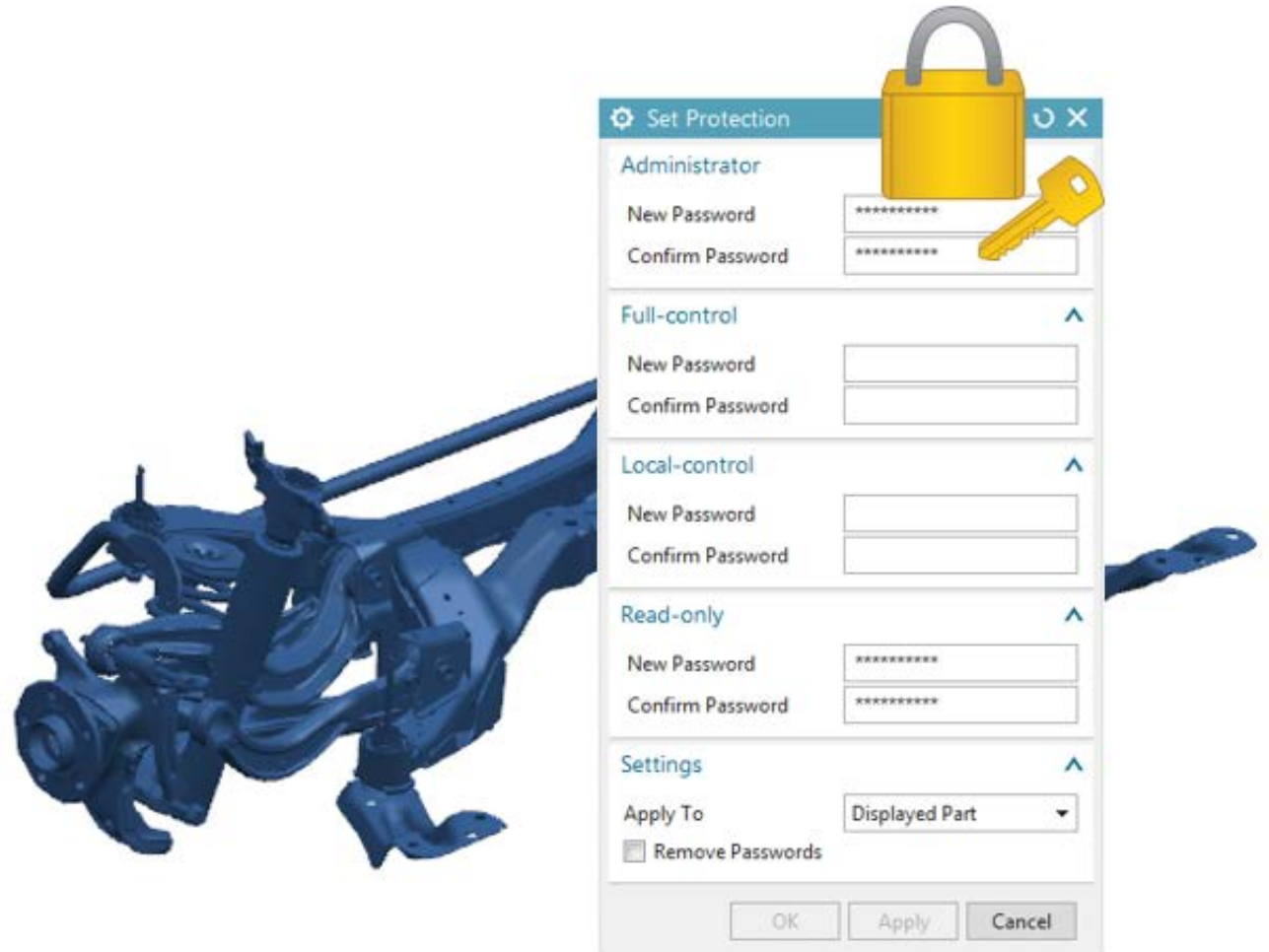
# User Experience

- Capability
  - New gestures simplify zooming and deselecting
  - Table Editor Layout Find
- Customer Benefit
  - Increased user efficiency and productivity
  - Improved navigation in large data sets



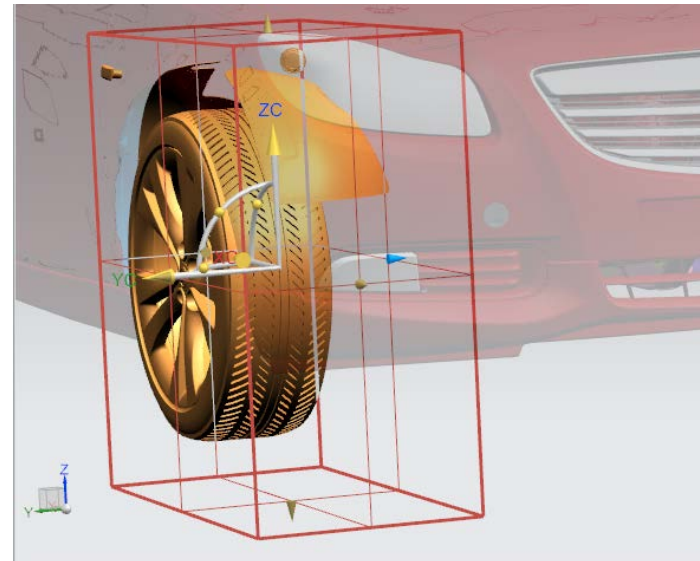
# User Experience

- Capability
  - Simple Part File Password
  - Units in part files
  - Product Excellence Program
- Customer Benefit
  - Enhanced supplier collaboration security
  - Improved consistency and smaller file size
  - Continuous improvement



# User Experience

- Capability
  - 3D box selection
  - Visualization enhancements
- Customer Benefit
  - Easier selection in large, complex design
  - Improved performance and better understanding of design

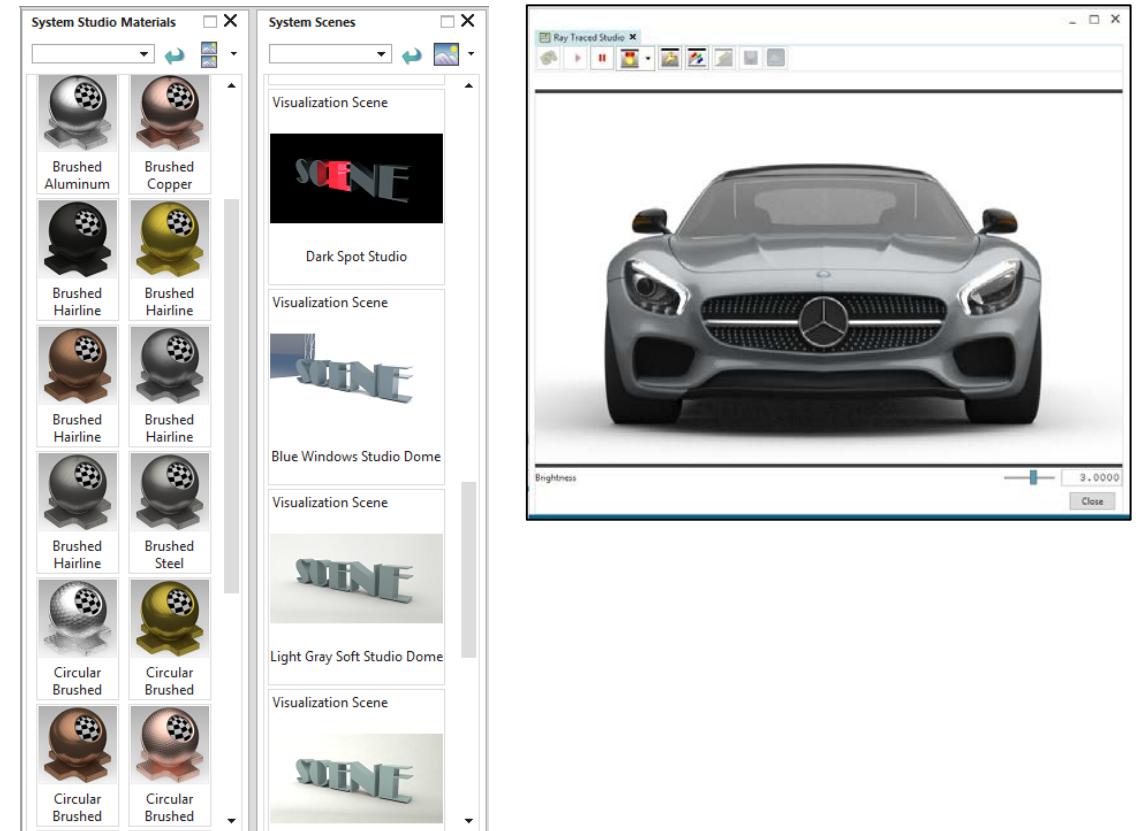




# User Experience

- Capability
  - High End Rendering
    - Studio Material Editor
    - System Studio materials and scenes
- Customer Benefit
  - Easier and faster image creation and design validation

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# NX 12 for Product Design Summary



## Modeling

Convergent Modeling  
Additive Manufacturing  
Lightweight design

## Process Specific Design

Animation Designer  
P&ID Designer  
Tooling  
Shipbuilding

## MBD and Drafting

Convert to PMI  
Convergent bodies  
Dimensioning

## Teamcenter Integration

Attribute management  
Systems Driven Product  
Development



## User Experience

Multiple display parts  
Security  
Box select