NX I-deas Master Surfacing

Free form surface modeling and editing tools

Benefits
- Create and modify even the most complex geometric shapes in an interactive, graphical, easy-to-use environment
- Enable mixed creation of design intent and dimension-driven shapes with unconstrained, free form shapes
- Fully integrated with feature-driven part history introduced in Master Modeler
- Easily modify and update complex shapes which could require manual re-creation in other systems

Features
- Design intent driven surfacing tools include: loft, sweep, variational sweep, surface-by-boundary, emboss and flange
- Variational sweep feature allows swept cross sections to vary based on dimensions, constraints and intersections with existing geometry
- Complete surface offset, trim, extend, wrap and unwrap capabilities

Summary
NX™ I-deas™ Master Surfacing is an add-on module within NX I-deas software that is the advanced surface modeling complement to NX I-deas Master Modeler. It helps you quickly and easily design and iteratively modify complex sculptured surfaces on both solid and open parts. Master Surfacing provides a rich set of curve and surface creation tools for lofting, sweeping and blending surfaces, giving you excellent local and overall control of surface shape. Advanced fairing operations help you remove bulges and achieve excellent local shape control. The results are smooth, attractive and manufacturable three-dimensional free form surfaces.

Modeling complex surfaces
Because Master Surfacing maintains relationships between geometric entities such as surface tangencies throughout the design effort, you not only can create your shape but also easily make design changes. Once you master a small set of curve and surface modeling commands, the power of an advanced surface modeler is available to you. Master Surfacing includes a full set of construction tools for creating and manipulating surfaces and curves. The following are some key capabilities:

Variational sweep surface
NX I-deas' Variational Sweep feature takes the "sketch-in-place" concept for planar geometry and extends it to complex free form geometry. V-Sweep lets you sketch a cross

Master Surfacing provides lofting, sweeping and blending capabilities which allow associative feature-based definition of extremely complex geometry.
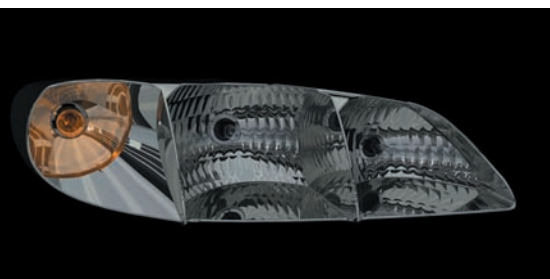
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Features *continued*
- Free form shaping tools for geometry that is not intended to be dimension-driven
- Complex curve creation tools for three-dimensional B-splines
- Comprehensive surface analysis tools

Master Surfacing allows you to directly incorporate styled surfaces from Imageware Surfacer or other styling packages, and use them to associatively drive the feature-based design of complex components and assemblies.

section "in place" to be swept along a path while simulta-neously tracking multiple rails (curves or edges) for position and tangency control. This feature allows you to create complex, varying surfaces in a single step, surfaces that in other systems might take an order of magnitude more effort to develop.

Other surface operations
- Planar, ruled and revolved surfaces
- Lofted through cross section(s) and optional rails
- Swept from a cross section along a path
- Mesh from sections in two directions
- Surface-by-boundary creates n-sided surfaces from existing curves and edges with tangency control
- Surface-through-points – either from an ordered mesh or a random cloud
- Emboss wireframe profile onto surfaces with optional offset and side angle control
- Unwrap cylindrical, conical or tabulated surfaces
- Overcrown to add curvature to a thin part to compensate for springback when the part is stamped in a die
- Offset existing surfaces and keep both the selected geometry and the new offset surface, or only the offset surface
- Extend surfaces by a fixed distance, or to a plane, or to existing surfaces to make a corner between them
- Trim, split, merge and stitch or unstitch surfaces
- Match a set of tangent continuous surface edges to another set of tangent continuous surfaces
- Tangency control at surface boundaries either by using an existing edge or surface, or by defining tangent vectors
- Fully automatic mid-surface generation for most parts, plus additional interactive tools

- Modify surfaces by dragging points in 3D space
- Non-manifold geometry abstraction tools for such operations as creating internal partitions within the part model
- Direct import of Imageware free form surface features

Curve operations
- Fit curves through unevenly spaced points, or through a series of points on a surface
- Associative offset curves on surfaces
- Tangency, curvature and inflection control
- Extract curves from surface intersections, part edges or surface ISO parametric lines
- Project or wrap curves onto surfaces
- Dynamic curve manipulation directly on the curve, or from control points

Visualization and analysis
With surfaces and solids created in Master Surfacing, you can use all NX I-deas visualization tools including shaded images, hidden line processing, perspective views and evaluated surface displays. In addition, to help you evaluate curves and surfaces, specific display capabilities and evaluation tools are available including:
- Display curvature analysis via color contour or isolines of gaussian, maximum, minimum or principal curvature
- Display vector normal to or tangent to surface or curve
- List curvature and normal values of surface at a point
- Analyze tangency and position at surface/surface boundaries