

NX Shape Studio

Advanced tools for computer-aided industrial design and styling

fact sheet

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Summary

NX Shape Studio offers advanced surface design tools, analysis tools, and high-end visualization capabilities specifically tailored to the needs of the industrial and automotive designer, as well as automotive stylists. As Shape Studio is fully integrated within the NX portfolio of products, users can take advantage of modeling, assemblies, simulation, manufacturing, and product data management functionality. The combined strength of these products delivers the most complete industrial design and advanced surfacing solution available today.

Features

Provides tools for creating, modifying, analyzing freeform and aesthetically pleasing surfaces

Allows for conceptual models as well as for the production of precisely defined surfaces

Supports designer's need to control surface curvature and transitions

Mathematically well-defined and controlled

Provides dynamic displays of changes

Easy to use

Full toolkit for surfacing, analysis, and visualization



NX Shape Studio offers world-class design, analysis and visualization tools specifically tailored to meet the needs of industrial and automotive designers as well as automotive stylists. There are four main benefits of employing Shape Studio:

Powerful and flexible shape design and styling solution fosters creativity and innovation.

NX Shape Studio includes extensive shape exploration tools that enable fast, easy creation and evaluation of design alternatives. It offers easy to use curve and surface creation and sculpting capabilities with dynamic visual feedback. Users can begin designs with or without precise

geometric definition and then add geometric constraints. Users can take advantage of complex mathematic and analytic algorithms without limiting design creativity or encumbering the design process. There are numerous tools for creating and ensuring that surface edge continuity and surface-to-surface transitions stay in place while the design evolves.



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Benefits

Foster creativity and innovation through powerful and flexible shape design and styling solutions

Guarantees precisely defined product designs

Provides an extensive suite of high quality rendering and image generation capabilities

Fully integrated with product design, engineering and manufacturing software



Analysis tools guarantee precisely defined product designs.

NX Shape Studio provides analytic gauges and visualization options that can be applied to surfaces or curves, providing immediate feedback by measuring deviation, curvature, rate of curvature changes and surface smoothness during geometry manipulation. Aside from examining the overall design, these sophisticated tools ensure manufacturability and feasibility of the design from engineering, as well as production, points of view.

Extensive suite of design rendering and high quality imaging capabilities.

NX Shape Studio can be used to visually analyze designs, to communicate design appeal and produce publication ready images. These tools include the ability to map materials and textures to the product, control lighting, visualize the product in a controlled environment, and add a variety of image special effects.

Fully integrated with product design, engineering and manufacturing tools.

Full integration with other NX applications allows NX Shape Studio users to leverage the strengths of both computer aided industrial design (CAID) and CAD systems. This integration eliminates the need for data translation, which could lead to duplication of effort, data loss, and misinterpretation of design intent. Shape Studio is a complete toolkit, including the most comprehensive set of modeling/design, shape analysis, and visualization tools available.

With Shape Studio there is no creative compromise, and the designer retains control of the design throughout the entire product lifecycle. Designs are fully associative allowing changes to automatically propagate to other NX applications and vice versa.

Shape Studio leverages advanced NX knowledge technologies, which can be used to speed the design process and insure compliance with company best practices. Shape Studio is complemented by other NX solutions, such as NX Imageware™, for reverse engineering and inspection.

Main capabilities

Surfacing

NX Shape Studio facilitates the creation of curves and surfaces that are mathematically precise using tools that eliminate the complexity inherent in the results. Shape Studio allows for the creation of Class-A surfaces and provides surface-to-surface continuity controls that are suitable for the most demanding requirements including automotive and consumer product design, guaranteeing manufacturability. Creation of these surfaces can be as easy as specifying points by screen location. Specific surfacing capabilities include:

- *Deform sheet* – A user can easily modify the shape of a surface by stretching, bending, twisting, and skewing curvature. Slider controls allow rapid manipulation of surface shape with real time dynamic display ensuring that the user has a simple and reliable approach to altering the shape of surfaces.
- *Swoop* – With swoop, designers can easily create and edit b-surfaces by specifying the diagonal vertices of the surface and shape characteristics such as bend, twist and skew.
- *X-form* – Allows the modification of styling geometry including curves and surfaces by editing the control poles or points including the ability to simultaneously move multiple poles or points. X-form provides a range of control functions to ensure that designers can control the effects of their editing including the restricting (locking) of regions that can be modified and controlling the impact of change. Real time dynamics ensure visual feedback of the impact of surface modification.



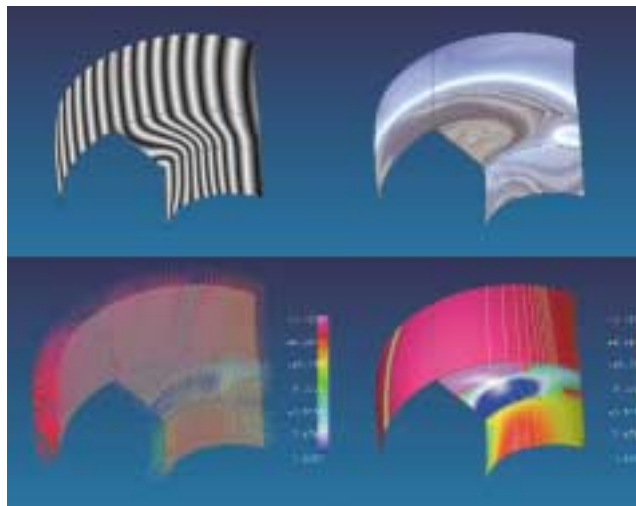
- **Styled blend** – Provides ability to blend across multiple surfaces and solid faces while maintaining constraints along the edges of the blend. As with other Shape Studio functionality, the emphasis is on ease-of-use and dynamic display of the results. Styled blends give the user complete control over edge positional (G0), tangential (G1), curvature (G2), and acceleration (G3) continuity. The user can also control the radius of the blend along both edges, the transverse (diagonal) depth of the blend across sections, and the parameterization of the resulting surface.
- **Curve on surface** – The dynamic mapping of 3D curves onto free form shapes allows the designer to rapidly generate construction geometry and style details.
- **Match edge** – Modifies a selected surface so it is geometrically continuous with one or more reference objects. This associative dynamic tool eliminates gaps between surfaces, or surface edges. Options allow the designer to specify the continuity from G0 through G3. As a fully associative feature, surface to surface continuity is maintained even when subsequent changes are made to the base geometry.
- **Studio surface** – Creates surfaces using pre-set surface building construction methods. These methods use combinations of section and guide curves. Dynamic construction enables the designer to immediately see the impact of adding more section and guide curves to the surface. Surface construction tools include four corner points, a single extruded section, surface through multiple sections, single section swept along a guide, and a surface through multiple sections and guide curves.

Analysis

Integral to the ability to create or modify curves and surfaces is the ability to dynamically analyze the effects of user input. NX Shape Studio includes an extensive suite of tools for visualizing and analyzing the shape of resulting surfaces.

Surface visualization options include:

- Surface highlights – reflection, projection, sectional, isocline or iso-parametric curves
- Analysis highlights – radial analysis with fringe, contour curves or curvature comb displays
- Visualization highlights – display reflection bands or images



In addition to the surface visualization options, Shape Studio includes the following analysis functions.



- *Deviation gauge* - Provides the ability to check the distance or angular misalignment between points, curves or surfaces with respect to other geometric objects and provide graphical and numerical feedback in real time. The user has full control over the sampling rate and range. Indicates locations where the desired deviation threshold may be exceeded, as well as places of maximum deviation.
- *Section analysis* - Verifies the shape and quality of surface geometry by dynamically creating and displaying planar cross-section curves and curvature combs.
- *Adjacent edge analysis* - Measures the deviation between edges of multiple faces to ensure surface continuity.
- *Draft analysis* - Provides visual feedback of any back draft condition on a part and assists in determining the optimum die press direction. A color-coded image displays the areas of the part that are open, closed, and within a user-defined tolerance band with respect to the press direction.
- *Grid section analysis* - Allows the mapping of rectangular, circular and freeform grids over the shape enabling designers to dynamically perform curvature analysis. Grid section analysis allows for rapid design quality checking.



Visualization and rendering

In order to better understand and communicate the aesthetics of the design, accurate surface and scene representation is required. Using NX visualization rendering capabilities, the designer can accurately represent surface colors, materials and textures in a realistic scene and produce high quality, static and dynamic images. These capabilities are explained in a separate NX Visualization and Rendering fact sheet.



Integrated NX capability

As a fully integrated module inside NX, Shape Studio enables users to take full advantage of all NX modeling functionality, including sketching, without the need to translate data or without fear of losing associativity between Shape Studio and other modeling features. Shape Studio augments existing sketch, curve, form and free form feature creation, editing and analysis capabilities. Shape Studio features can be used interchangeably with NX modeling, assemblies, manufacturing, drafting and simulation capabilities.

NX Imageware features

NX Shape Studio's industrial design capabilities are complemented by functionality included in the NX Imageware product. These capabilities include reverse engineering, computer aided inspection and polygonal modeling.

Images courtesy of Alloy Total Product Design
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