

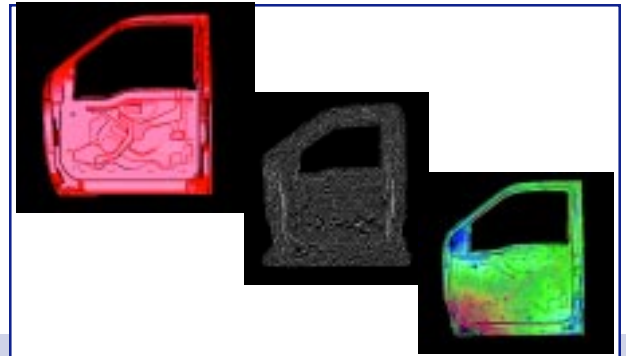
I-DEAS Freeform Inspection is a versatile and easy-to-use 3D measurement data analyzer that compares physical parts to nominal specifications and tolerances, and presents deviation analysis in both graphical and textual reports for intuitive interpretation of results, as well as enterprise-wide communication. In addition, I-DEAS Freeform Inspection provides a comprehensive set of surface model repair, prismatic feature construction and point/STL data processing tools to help product engineering complete the job of transferring design intent into production accurately and efficiently.

I-DEAS Freeform Inspection runs as a standalone software application into which a user can bring CAD models, “golden” reference data sets and 3D coordinate measurements from physical parts/molds/dies. Measurement device output and CAD models are united under a single user interface through the I-DEAS Freeform CAD databridges and real-time measurement device links, as well as file import of standard and proprietary data formats. The geometric analysis and verification process driven by I-DEAS Freeform Inspection can be simplified into the following components:

- Import theoretical model (e.g., CAD, STL, or golden reference points).
- Import and perform basic processing of measurement data (e.g., dense optical sensor data or discrete CMM data).
- Align measurement data to the theoretical model, if necessary.
- Analyze measured data based on the theoretical model: 3D analysis, cross section analysis, feature-based comparison, critical dimensions, etc.
- Report results using annotated graphical report and formatted textual report in PDF format, or spreadsheet-style ASCII data output.

## Customizable, Process-driven User Interface

The I-DEAS Freeform Inspection user interface is designed to facilitate the I-DEAS Freeform Inspection verification process. Menus are organized to facilitate the progression of data analysis. Each tool shelf is comprised of icons for functions that are frequently used during a particular step of the workflow. In addition, both menus and toolshelves are user customizable to accommodate variations to the general process.



*I-DEAS Freeform Inspection provides a strong visualization engine that displays analysis results in an intuitive graphical format for further detailed queries.*

## Point Processing and Measurement

I-DEAS Freeform Inspection provides tools to handle optical sensor point clouds and discrete CMM measurements. The point processing allows the user to clean up, sample, filter, merge, cross section, offset, project point sets, extract points and compute dimensions for critical features and edges, evaluate GD&T form characteristics on measurement data, and much more. I-DEAS Freeform Inspection also provides a key set of polygon editing functions for repairing and reducing STL data sets.

## Alignment Toolbox

The alignment functions in I-DEAS Freeform Inspection provide many different types of methods for aligning measurement data to the nominal model. Depending on the application needs, alignments can be done using one or a combination of the following methods:

- 3D general best-fit, which aligns two sets of objects by reducing overall Root-Mean-Square (RMS) error.
- Feature-based best fit, which aligns prismatic feature-pairs by reducing overall RMS error on all feature pairs.
- Feature-based weighted, which takes a step-wise approach to feature-pairs by aligning subsequent feature-pairs within the remaining degrees of freedom left by proceeding feature pair(s).
- Standard 3-2-1.
- Iterative alignment based on the Reference Points System (RPS).

## Geometric Verification and Dimensional Analysis

The 3D comparison functions are used to assess overall geometry of an object as compared to the nominal, based on its surface profile tolerance. The user can compare measurement points to surfaces, points to points, and points to STL data. Deviation results are reported in terms of total deviation and/or normal deviation from the measurement data to the nominal model. Normal deviation is also known as residual deviation, which is the point to surface deviation along the surface normal direction. For comparison of CMM data to nominal specifications, probe radius is automatically compensated in the calculations. Furthermore, I-DEAS Freeform Inspection provides a cross section comparison that reports the deviation between points and surfaces at the cross section plane. Color-coded deviation maps and error needle plots are generated for all deviation analysis. These color maps provide a strong visual cue pinpointing the main sources of error and the trend of deviation over the body of the part. Color-coded needle plots are often better suited for discrete data comparison analysis. Complementary to the color map and needle plot output, analysis query functions provide detailed numerical reports per measurement point or for a localized circular region.

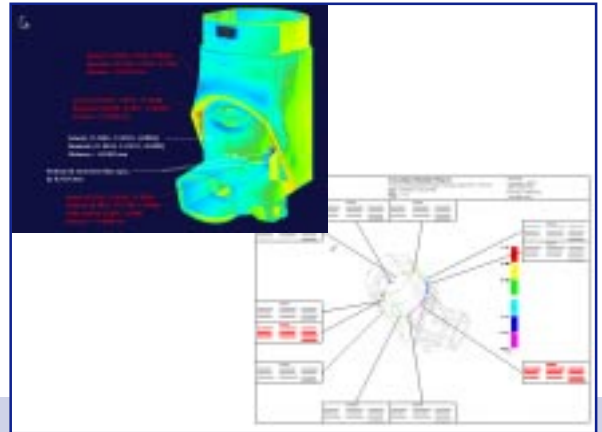
Dimension annotation is an important part of the verification process. Linear, angular and radial dimensions can be called out on critical feature data. Dimension reports are automatically generated for all dimensions along with nominal dimension and tolerance values.

## CAD System and Measurement Data I/O Support

I-DEAS Freeform Inspection supports all major CAD systems through I-DEAS Freeform CAD databridges, which accurately transfer mathematical models into I-DEAS Freeform Modeler's NURBS-Bezier geometry engine. In the I-DEAS environment, I-DEAS file export can write I-DEAS models out to the I-DEAS Freeform file format (.imw) directly. I-DEAS Freeform Inspection also supports international standards such as IGES and VDA-FS.

I-DEAS Freeform Inspection can support real-time device links to portable CMMs, which are SMX and Leica laser trackers, Romer and Faro articulated arms.

For detailed information on data translators and databridges, refer to the I-DEAS Freeform Data Translators/ Databridges catalog entry.



*With I-DEAS Freeform Inspection, you can generate user-customizable reports, in both graphical and textual output formats.*

## Advanced Graphics

- 3D dynamic viewing: pan, zoom, rotate
- Multiple clipping planes for viewing hidden geometry and analysis results
- Non-proportional zoom for easy identification of part warpage and analysis compensation

## Automation

I-DEAS Freeform provides the SCOLL macro-programming environment in conjunction with interactive menu functions within I-DEAS Freeform Inspection to allow automation of the complete job or routines within a job. Automated routines can be incorporated into the regular menu structure and toolshelves.

## Prerequisite

I-DEAS Freeform components and direct links are shipped on the I-DEAS CD and can be installed with or without the I-DEAS products.

## For More Information

For more information, contact your local SDRC representative or call 1-800-848-7372.