

MBE Starts with Interoperability:

Supporting MBD CAD & Automation for a Model-Based Enterprise

Annalise Suzuki
Elysium Inc.

GLOBAL PRODUCT DATA INTEROPERABILITY SUMMIT 2018



ELYSIUM

Parker Aerospace

NORTHROP GRUMMAN

BOEING

ELYSIUM

Parker Aerospace

NORTHROP GRUMMAN

BOEING

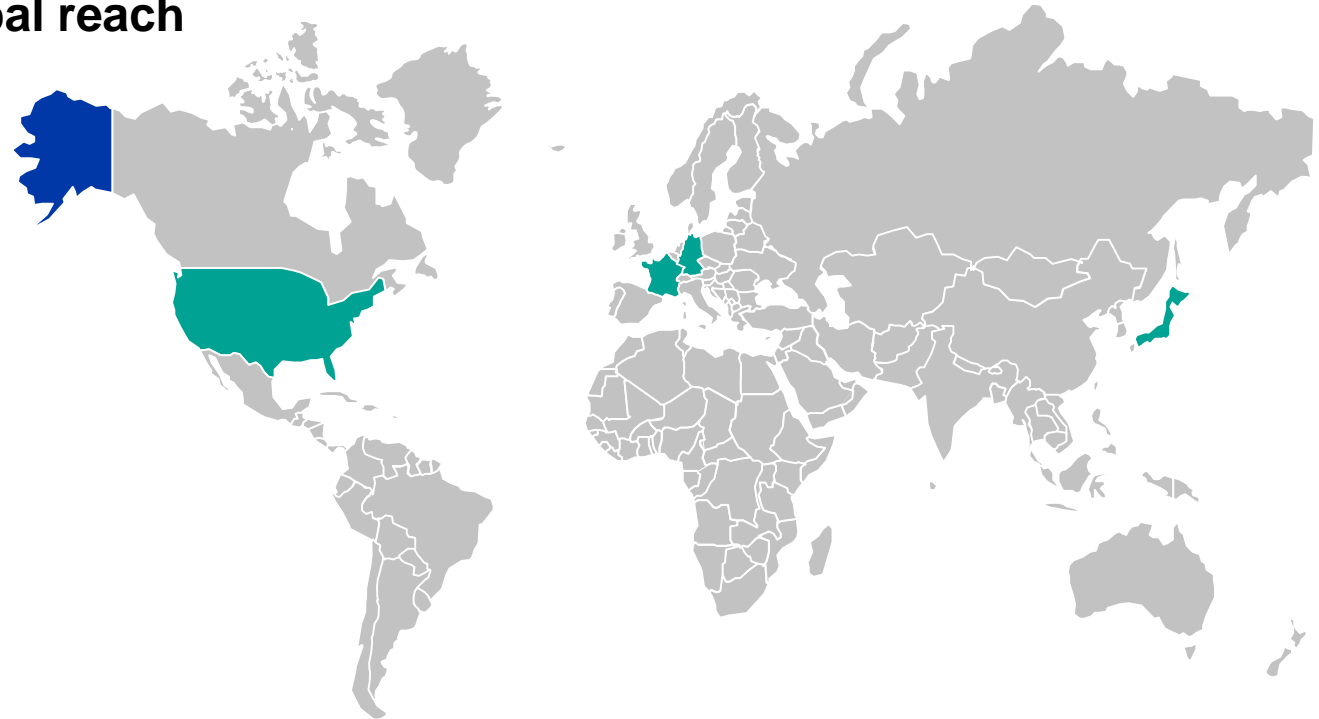


Elysium Global

Global Product Data Interoperability Summit | 2018

Specialized + dedicated technologies with a global reach

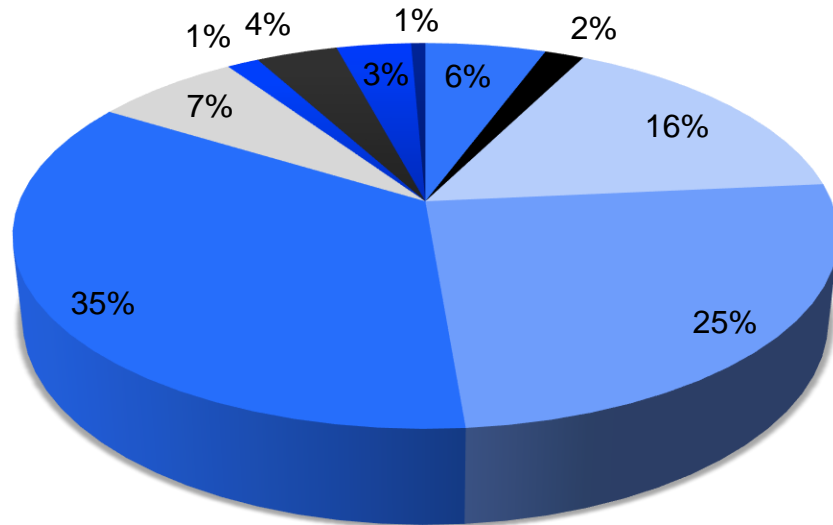
- Over 30 years of CAD Expertise
- Strong partnerships with CAD Vendors
- 3D Data Expertise
 - Translation
 - Geometry Healing
 - Quality Management
 - Validation
 - Simplification
 - Reverse Engineering/ Point Cloud Rendering
- “Off-the-Shelf” Software, Development Projects & Migration Services



Industries Served

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ELYSIUM has over 2800 customers around the world with a strong position in the manufacturing industry.



- Aerospace & Military
- Automotive OEM
- Automotive Supplier (Tier-x)
- Energy | Oil & Gas
- Engineering Services
- Architecture & Construction
- Automotive Supplier (Tier-1)
- Consumer Electronics & Products
- Heavy Industry
- Shipbuilding

NORTHROP GRUMMAN

GENERAL DYNAMICS

LOCKHEED MARTIN

BOEING

AIRBUS
DEFENCE & SPACE

BAE SYSTEMS



Rockwell
Collins

Honeywell

ADIENT



DAIMLER

HITACHI



MITSUBISHI
HEAVY INDUSTRIES, LTD.

Johnson
Controls

SAMSUNG

MAGNA



NOKIA

Continental

SIEMENS

Koito

AININ



BOSCH

DELPHI



BRIDGESTONE

KOMATSU

TOSHIBA

Kawasaki

Panasonic

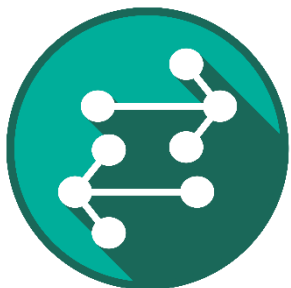
Rolls-Royce



Model Quality in all Applications

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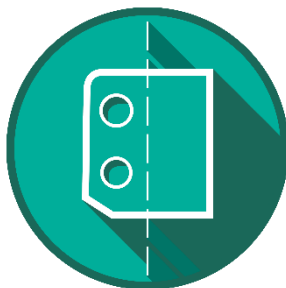
Many solutions to help your 3D data interoperability



Translation



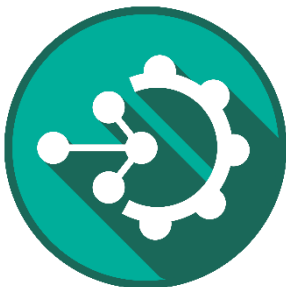
Healing



Simplification



Validation



Migration
(Feature-Based Translation)



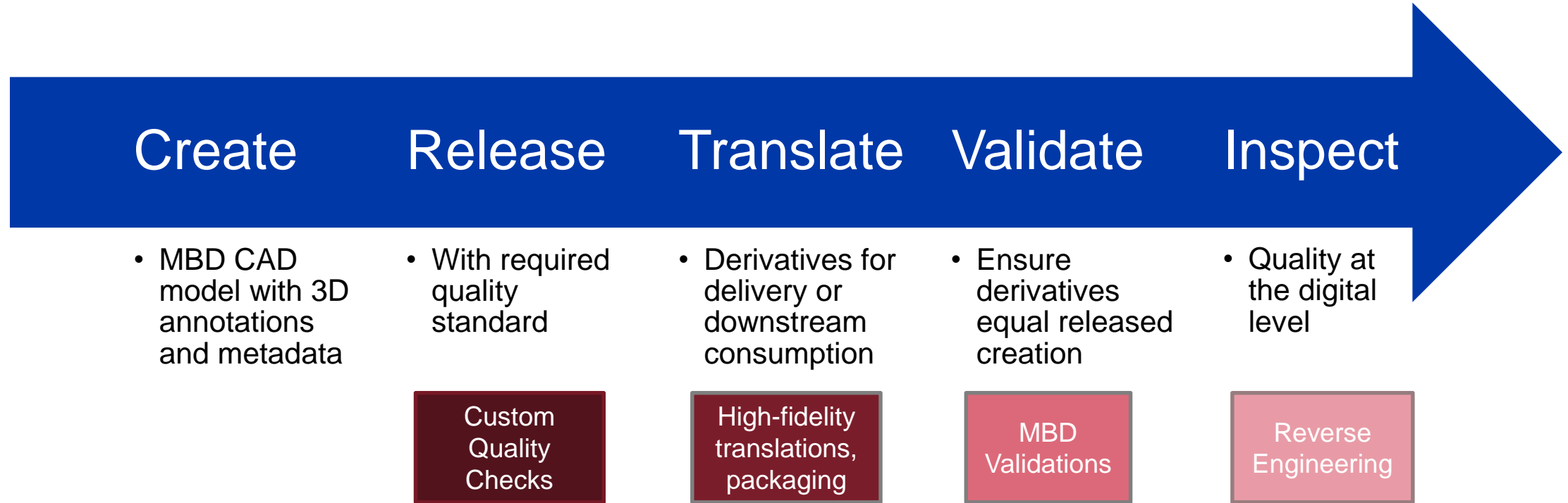
Quality Check



Solid Enveloping

Steps in a Model-Based Lifecycle

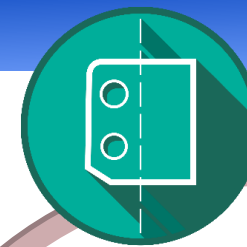
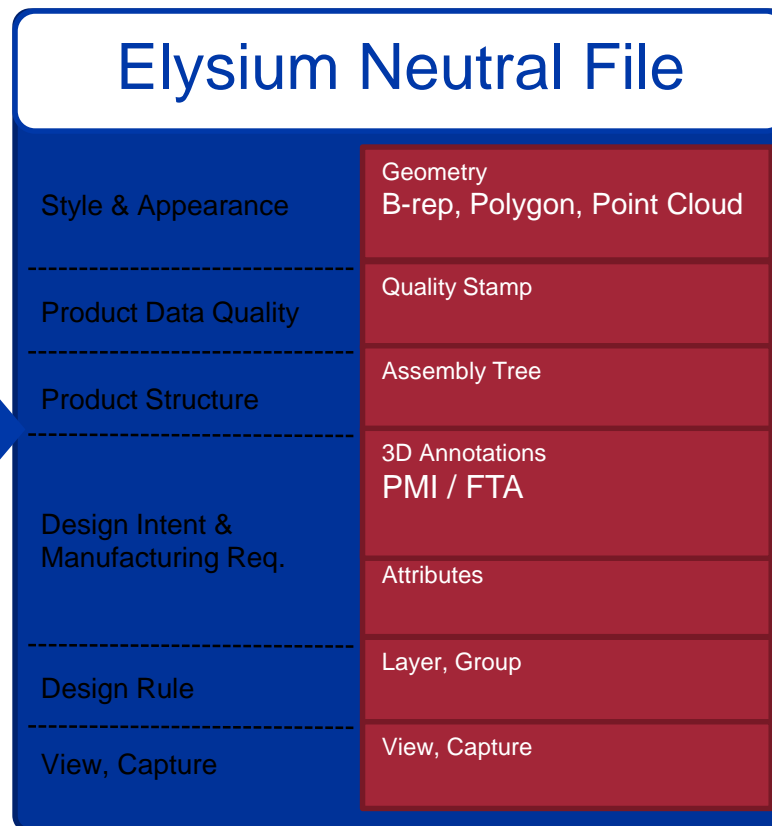
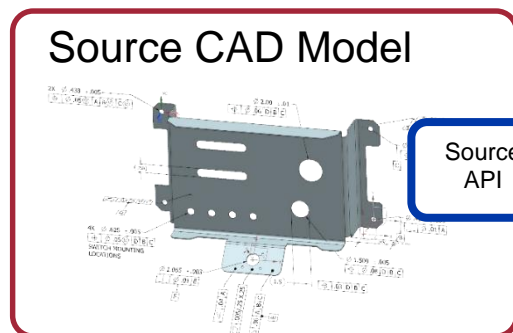
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Elysium Neutral File

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The precision and expertise of Elysium relies on this powerful format



Simplification



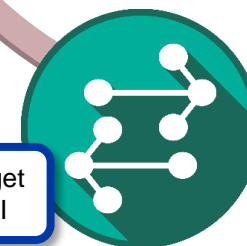
Healing



Quality Check



Validation



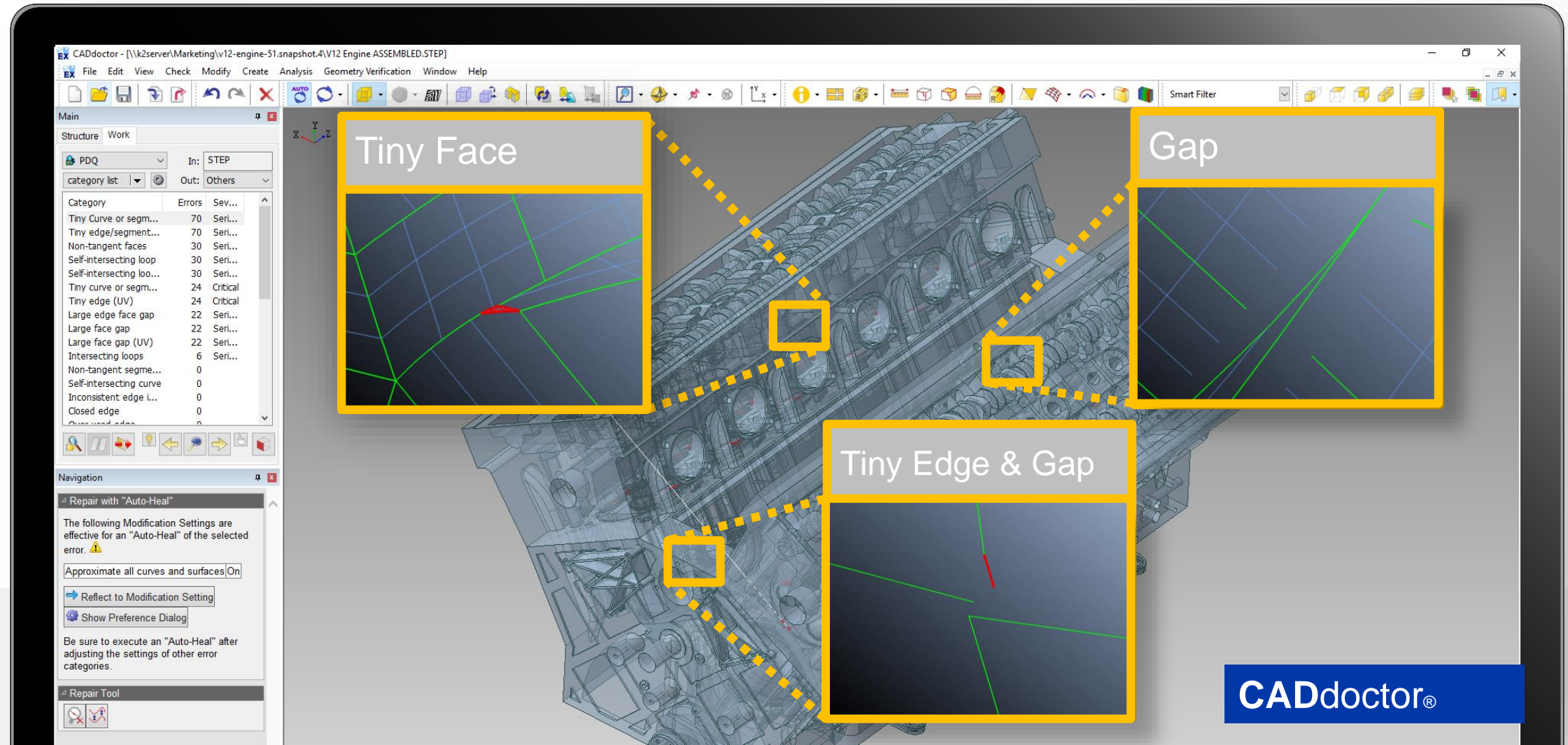
Translation

Target API

Accurate Geometry Error Checking

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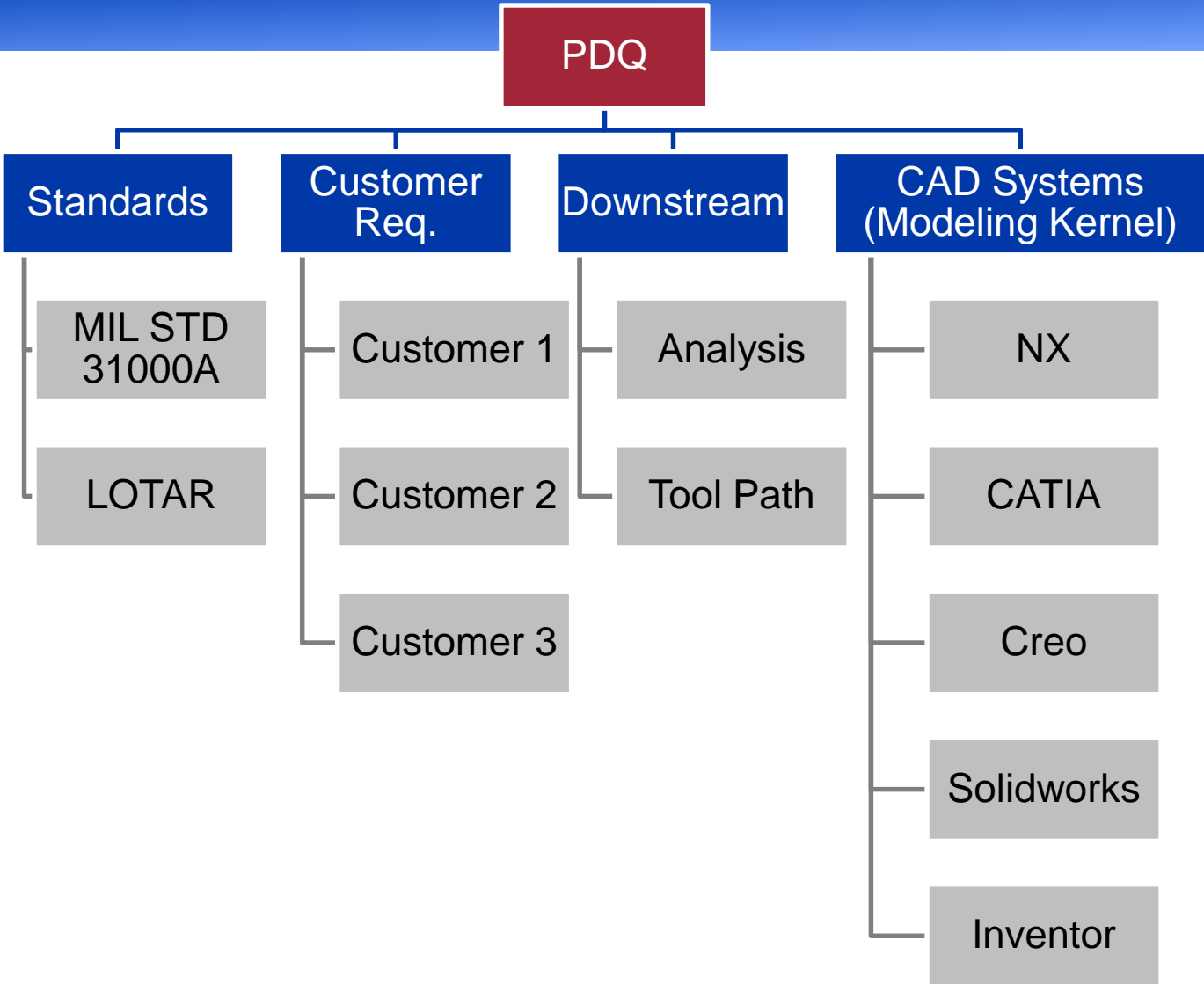
Elysium provides Product Data Quality (PDQ) checking to assure 100% high fidelity models for an enterprise.



Product Data Quality-Check/Verification

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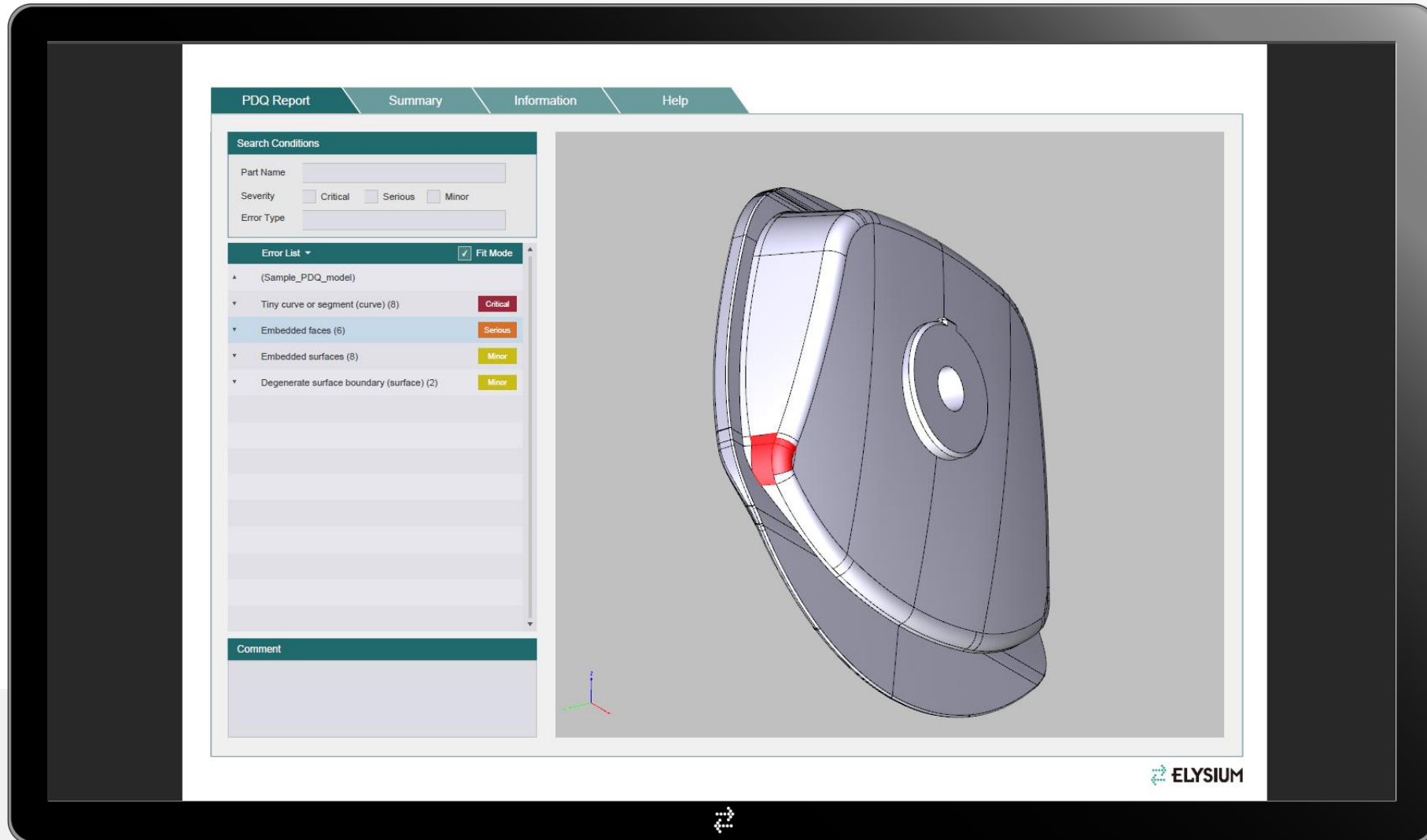
- Elysium offers 78 PDQ check items
- Customize checking criteria
- Check against multiple criteria



PDQ Report in 3D PDF

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Check model quality to a standard (SASIG, LOTAR, MIL STD 31000) and customer requirements

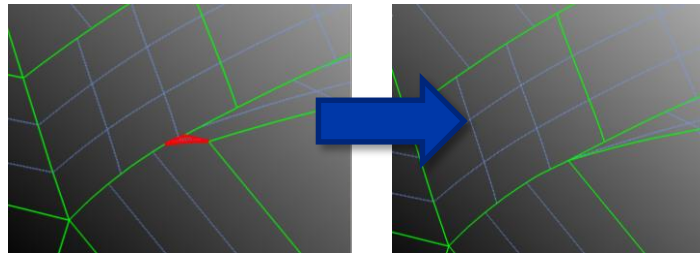


Powerful Geometry Healing

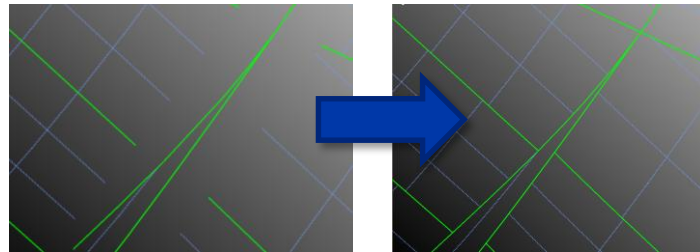
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Elysium's geometry healing capability creates perfect geometry for assured downstream consumption.

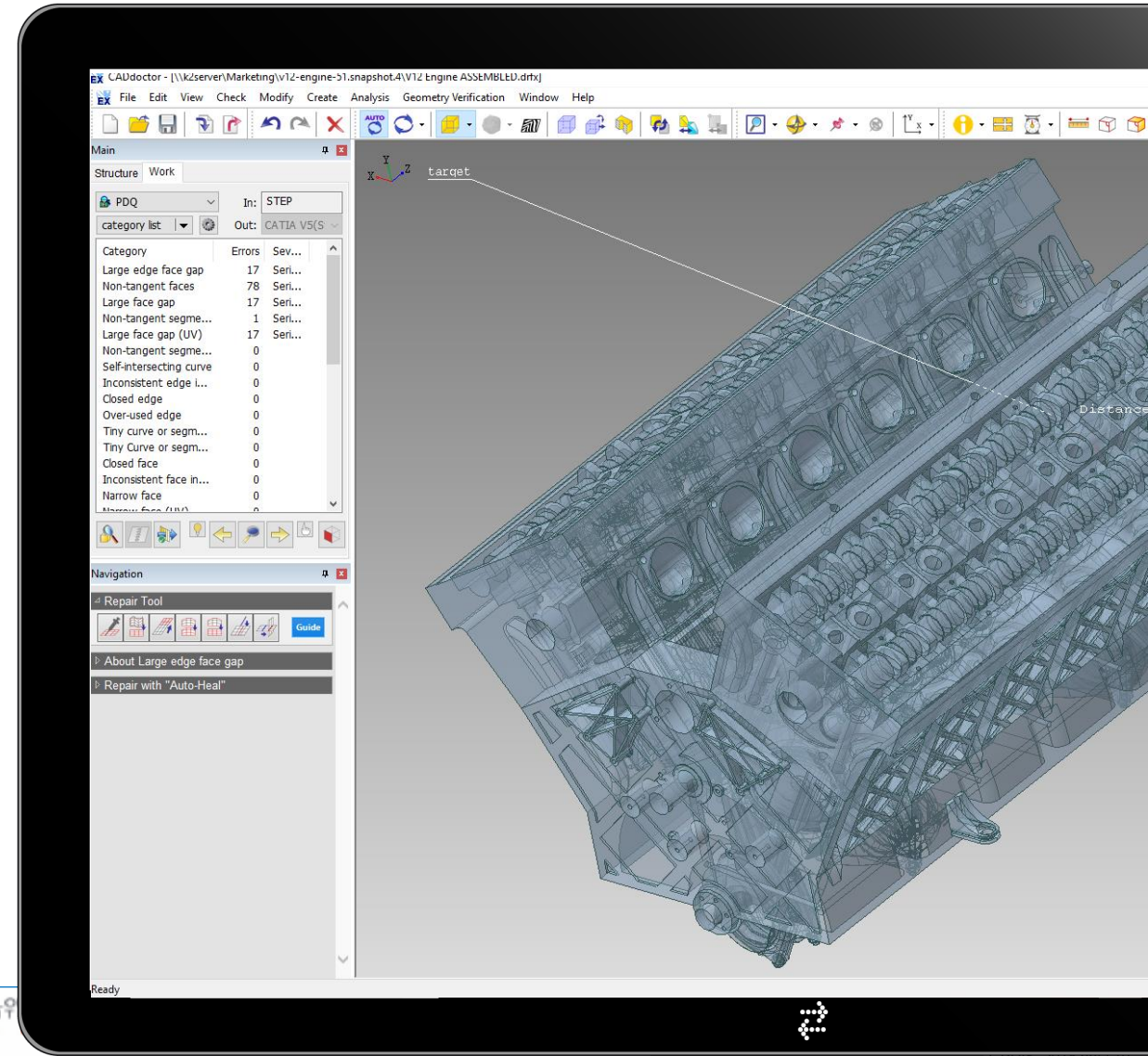
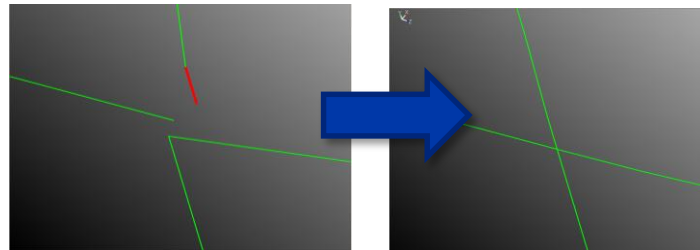
Tiny face removal
and edge
adjustment



Face extension
for gap filling



Tiny edge
removal and face
extension

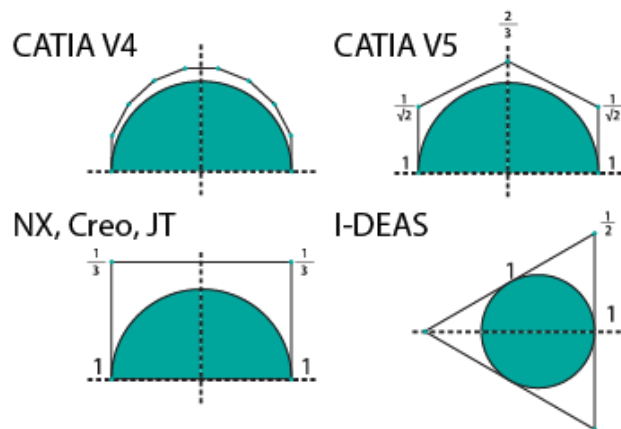


Why is Healing Required?

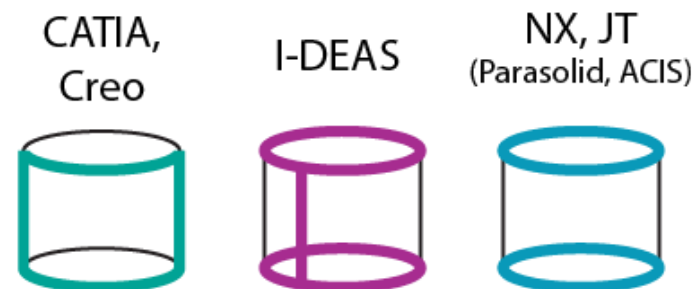
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CAD systems have differences. To move from one to another you need to understand these differences. Elysium's topological and geometry expertise allows us to breakdown each model to basic mathematical representation to apply into another mathematical definition.

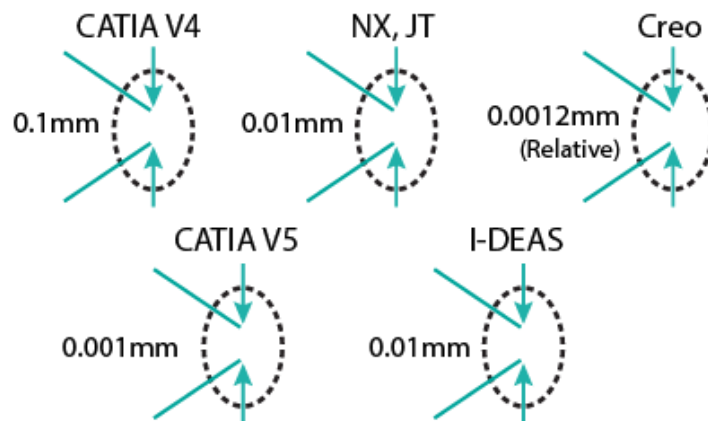
Mathematical Definition



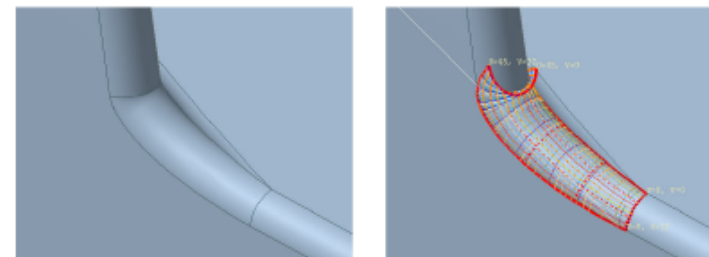
Topological Differences



Different Tolerances



Problematic Geometry



PMI/FTA Translations

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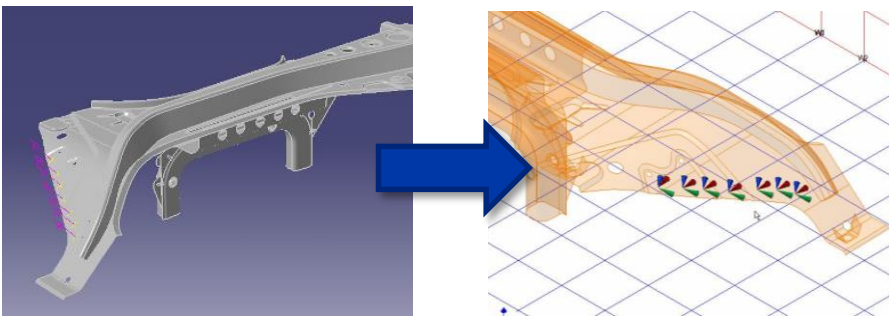
Cross-multiple translation of fully annotated 3D drawing data

Fully Annotated 3D Drawing Translation

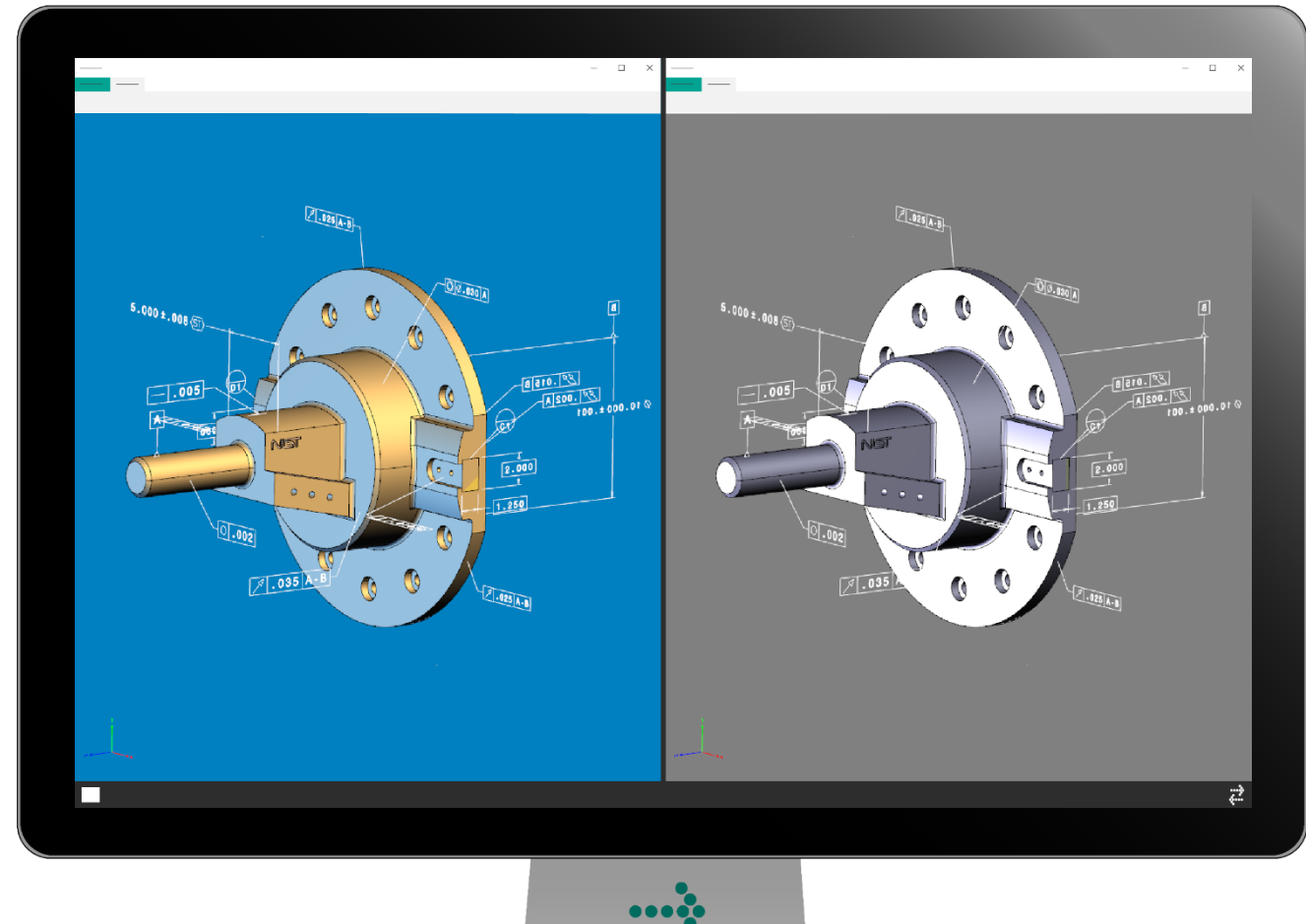
Support both native PMI/FTA translation and appearance translation. Keep associativity between annotation and element.

Flexible Mapping of PMI/FTA and Attribute

Enable to map specific annotation and attribute to recover non-supported entities at destination CAD.



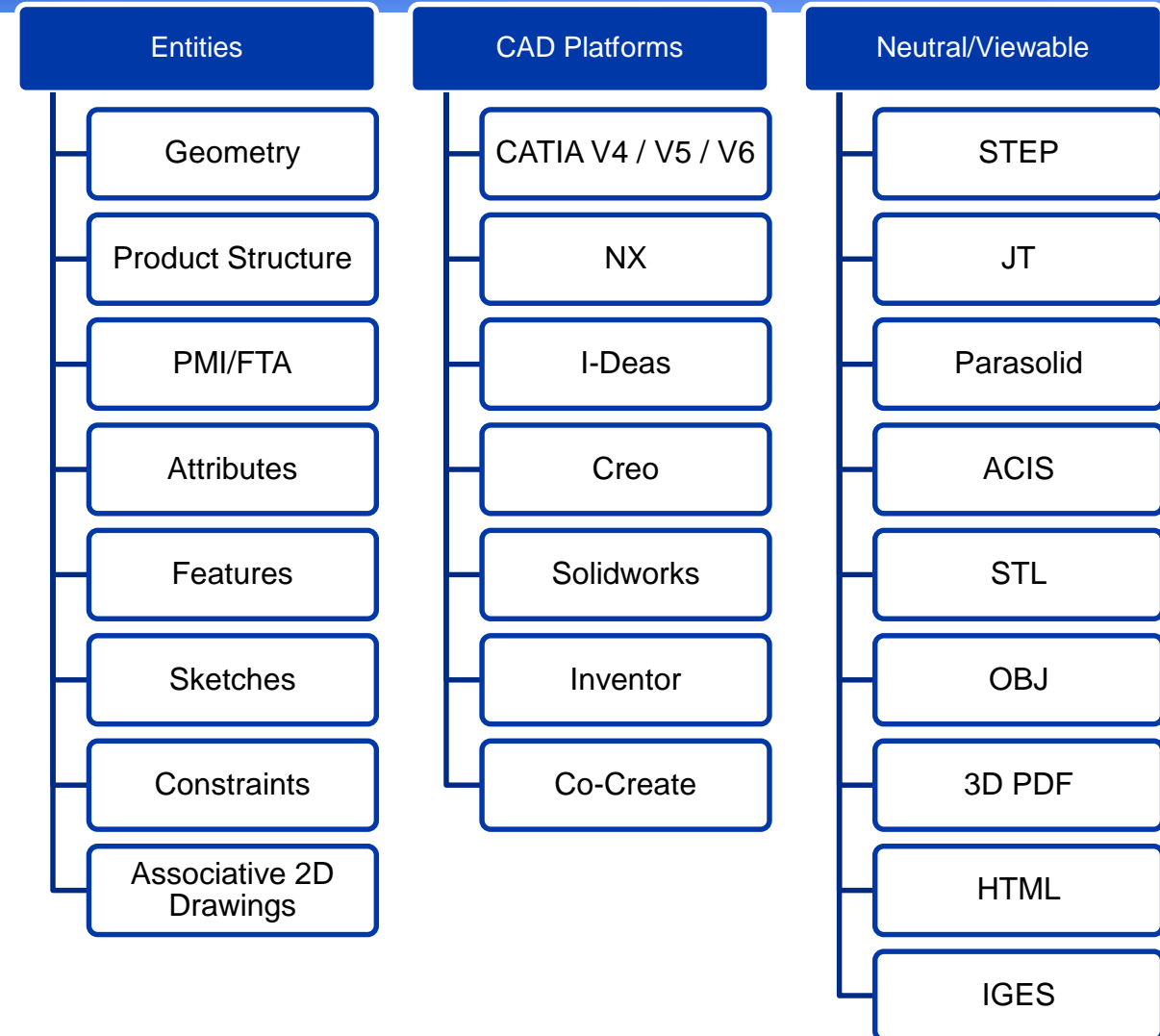
Map spot weld point of CATIA V5 to user attribute of specific parts of Inventor which are automatically created as spot point symbol through translation.



Data Translation Support

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Elysium supports a variety of different platforms, formats, and entities



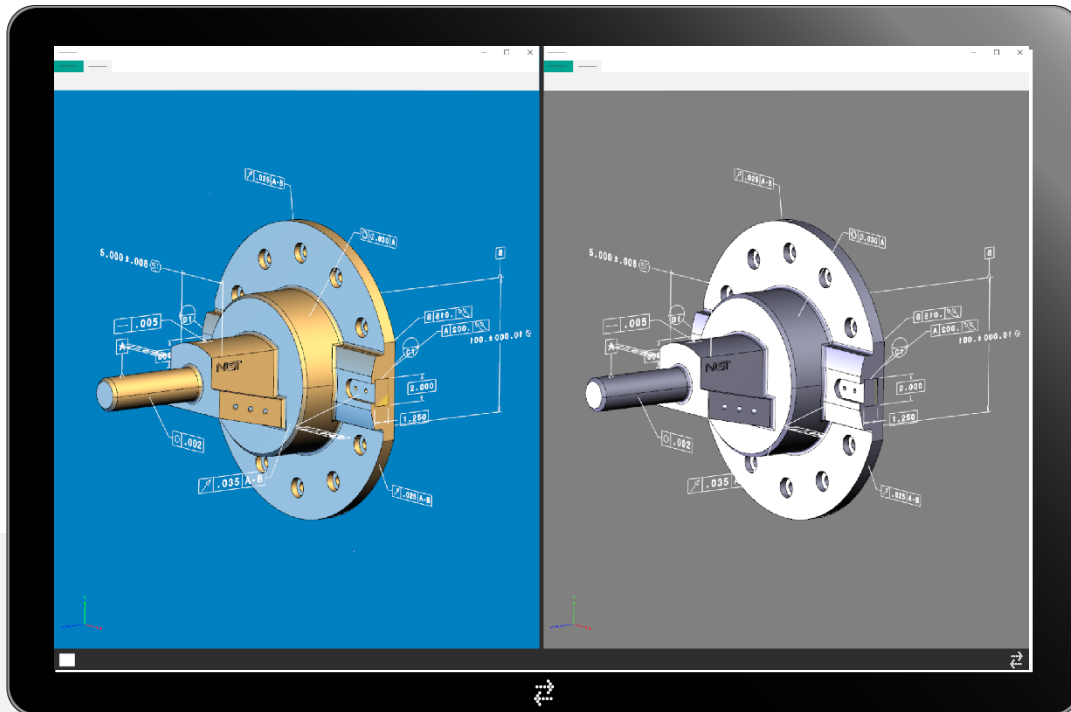
Feature-Based Translations

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Feature based 3D data translation maintains design intent and enables modification by features

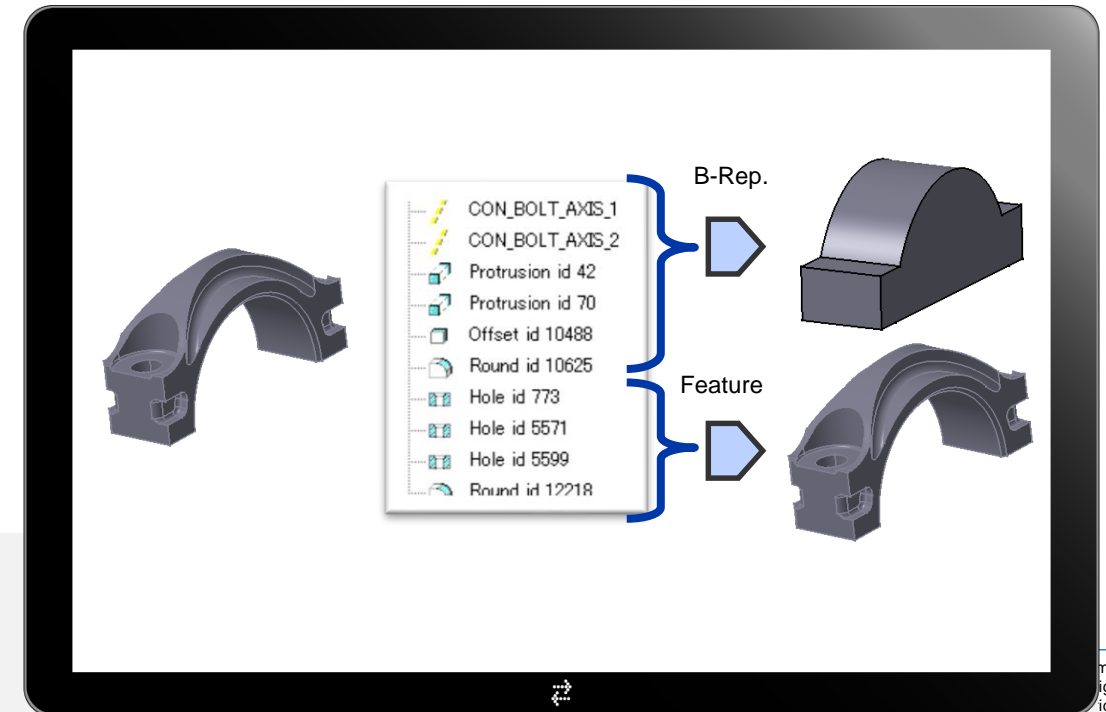
Fully Automatic Translation

Automatically extract feature tree from source CAD, map the feature tree to destination CAD, and rebuild 3D model at destination CAD with the mapped feature tree.



Hybrid Translation of Feature and Geometry

- Translate representation of fabricated material as geometry and definition of machining feature as feature tree.
- Recover un-supported feature as B-Rep translation.



Geometry Simplification

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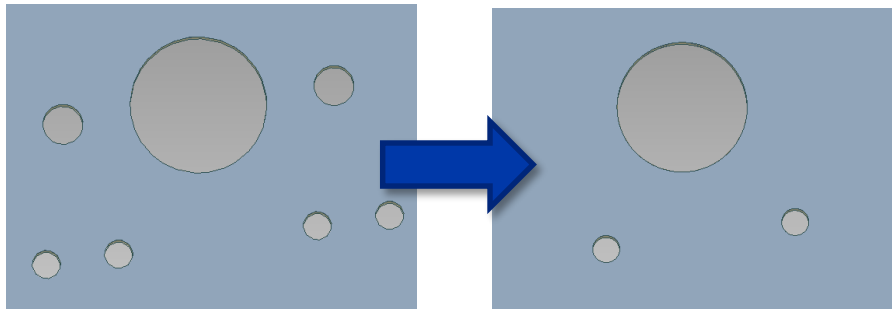
Optimize models for CAE analysis and intellectual property protection

Feature Recognition and Simplification

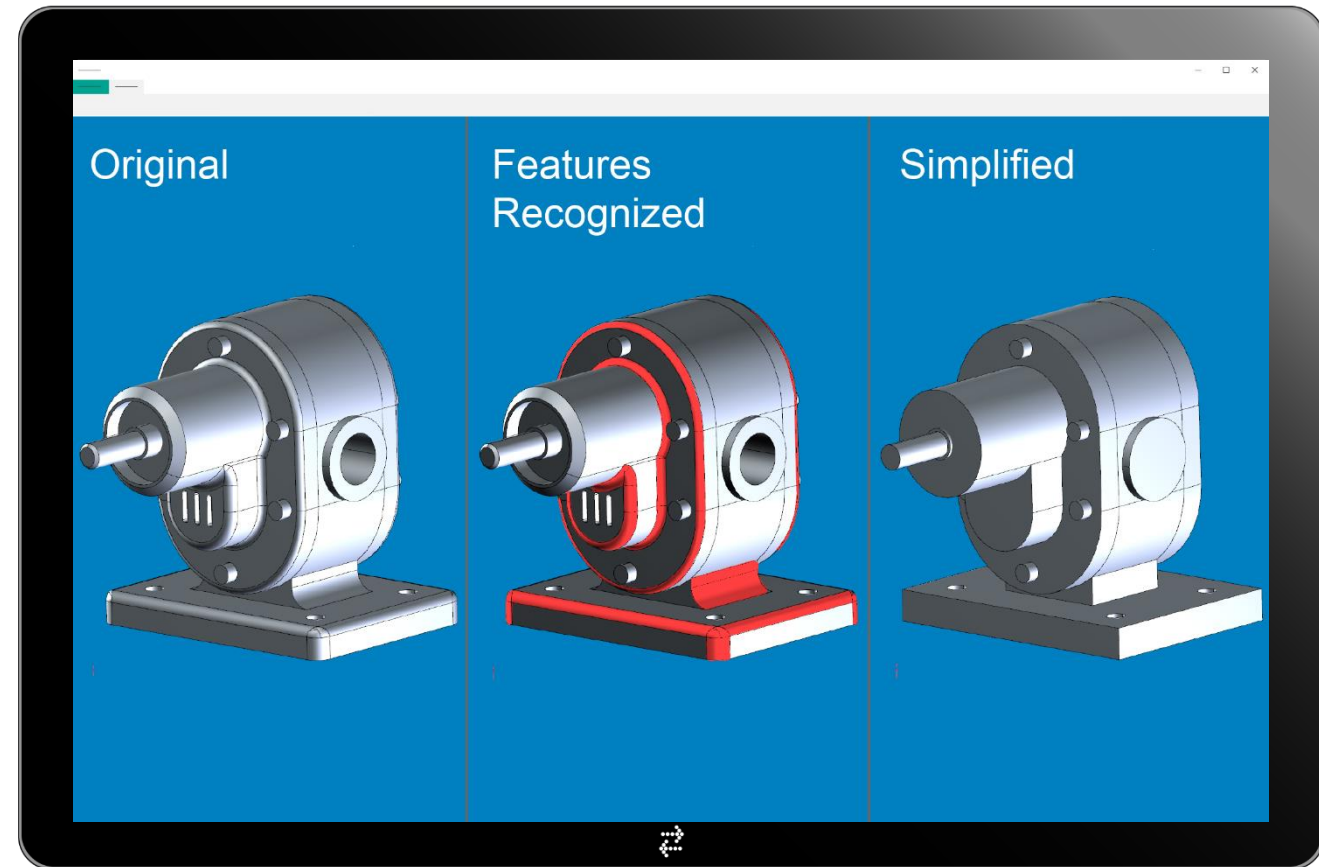
Automatically recognize geometric features like fillets or holes and remove them. Enable to recognize and remove overlapped/converging fillets and variation fillets.

Flexibility for Feature Removal

Choose which features you want to remove and which ones you want to remain. Allowing you to have full control of information shared.



Automatically recognize features, such as holes, and allow you to remove all or select the ones you want to remove



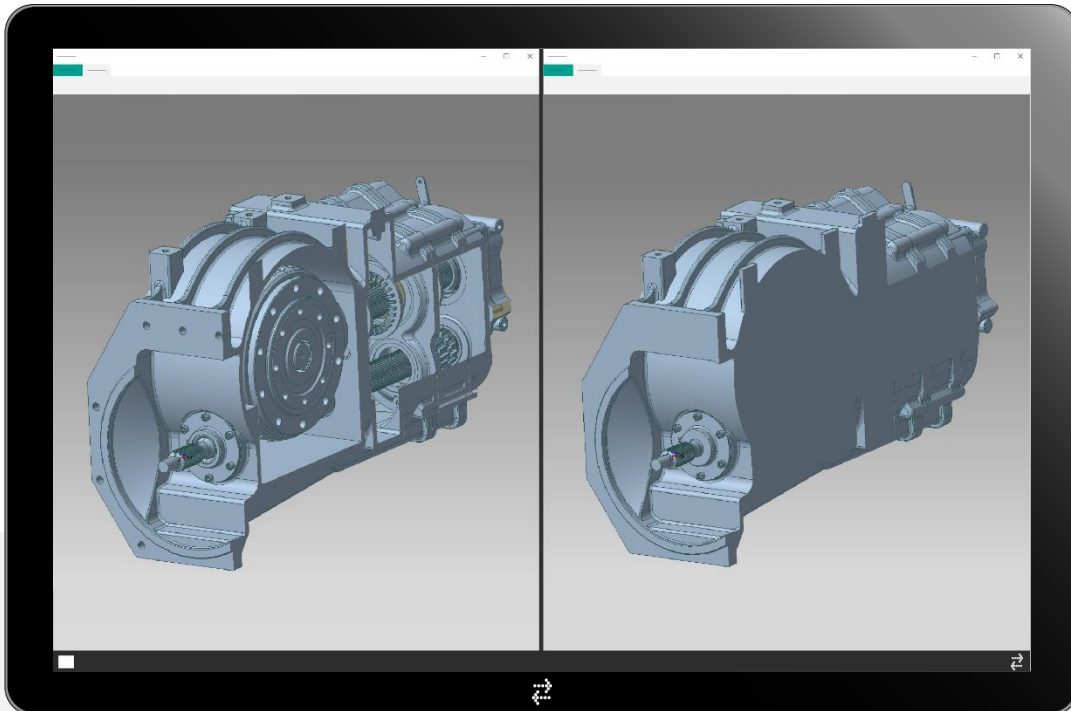
Solid Envelope | Surface Extraction

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Automatically simplify models for CAE, DMU or other downstream processes

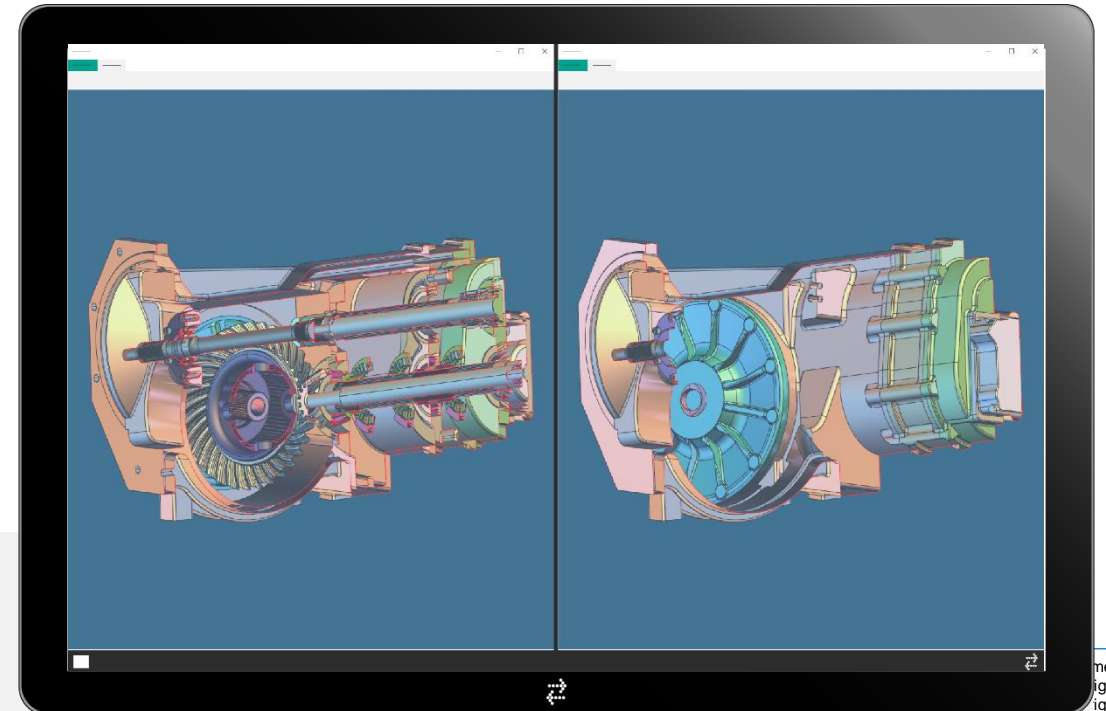
Solid Envelope

Fill inside of assembly model to create a solid model for size reduction and protect IP.



Surface Extraction

Extract the outline of the exterior parts or interior parts.



Mold Manufacturing Check

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Optimize models for CAE analysis and intellectual property protection

Built-in plastic injection knowledge

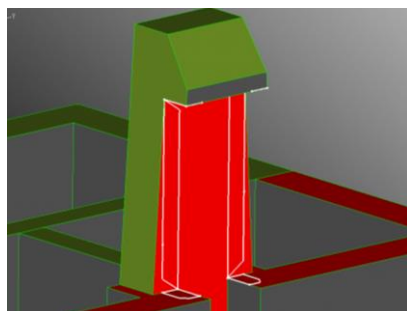
Mold manufacturing check is built on a knowledge base of plastic injection molding manufacturing processes. Utilizing this expertise, the software automatically knows what to look for and fixes it.

Check to manufacture

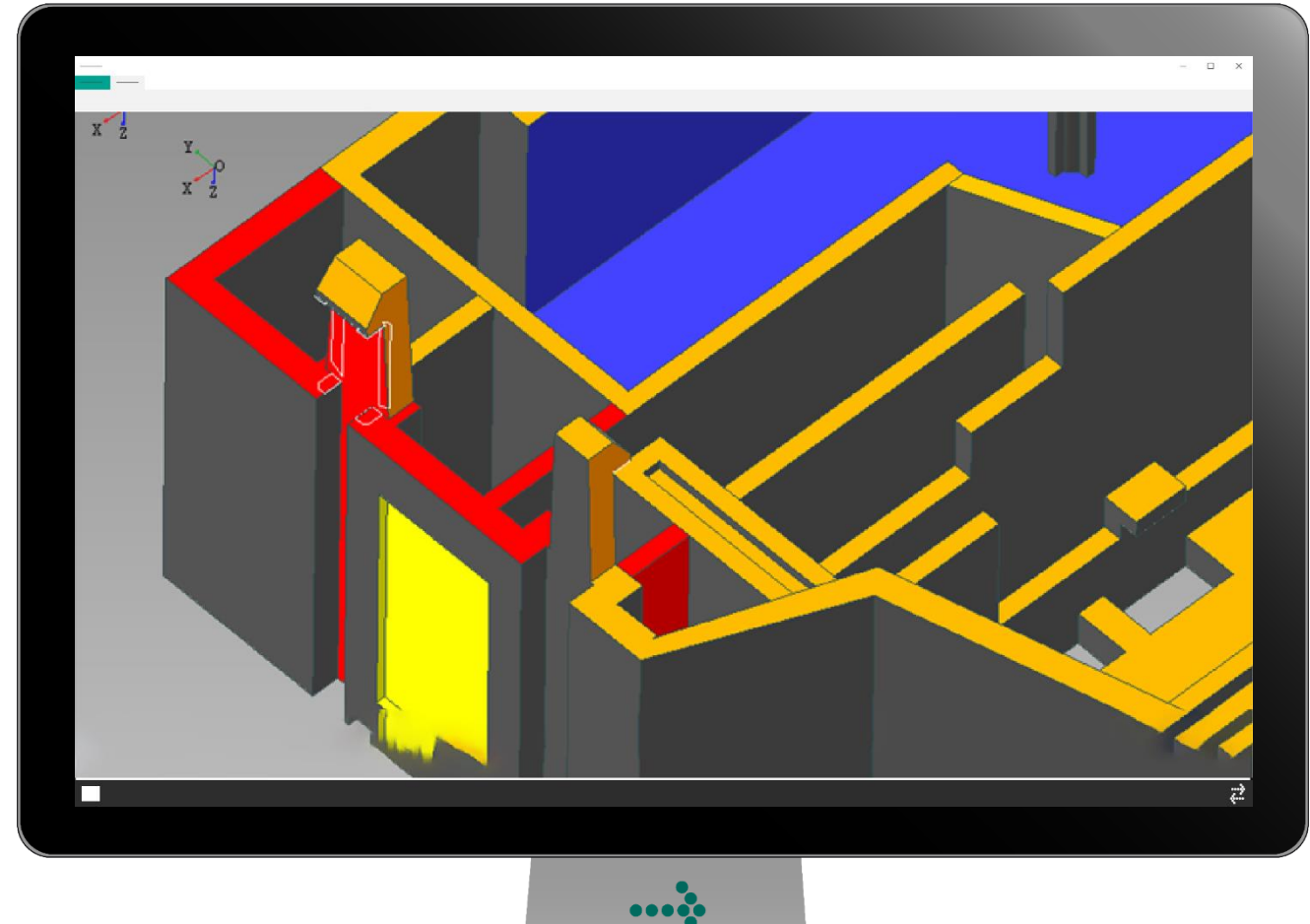
Checks 11 items in 3 categories; Product Formability, Mold Construction, and Mold Formability. Check items such as excessive/inadequate thicknesses, undercuts, sharp edges, deep trenches, small bumps and many others. Check criteria and tolerances can be set to company standards to ensure quality before production.



Sharp edge area detection



Undercut area detection



CAD Data Validation

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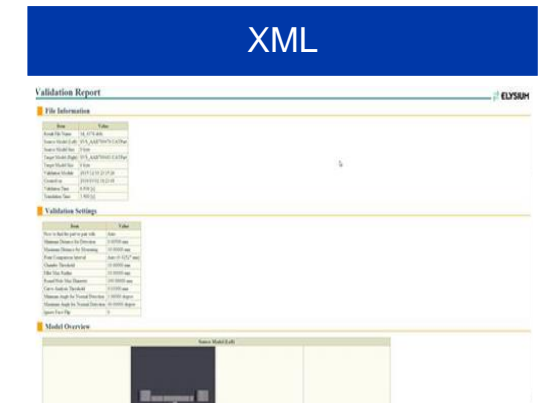
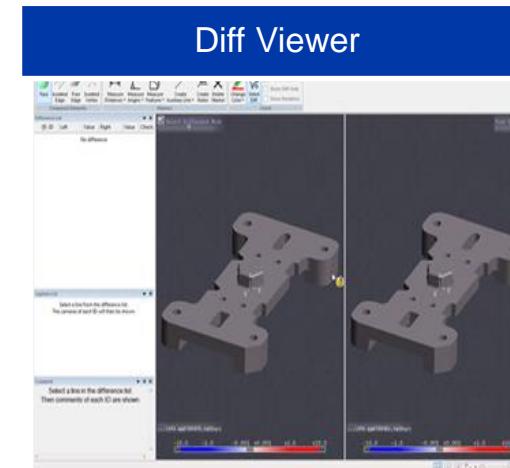
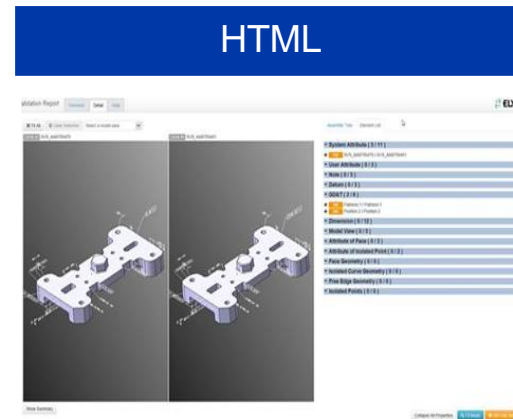
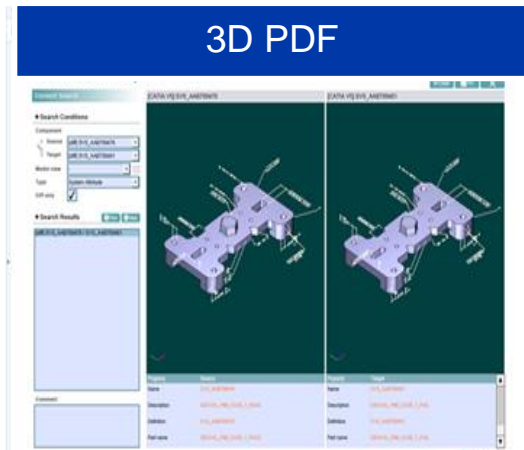
Robust Validation Solutions & Reports

Validation

- Translated derivative
- Engineering changes
- CAD version upgrade
- LOTAR

Customizable Reports

- Pass/fail criteria
- Downstream usability
- Multiple use cases



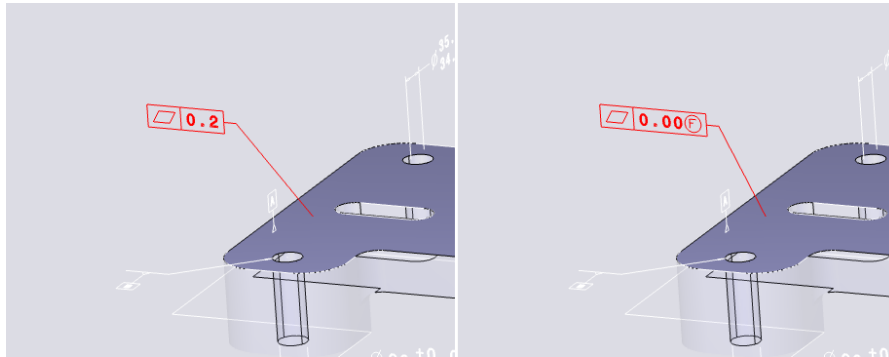
Validation of MBD Data

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Quickly identify differences between 2 files

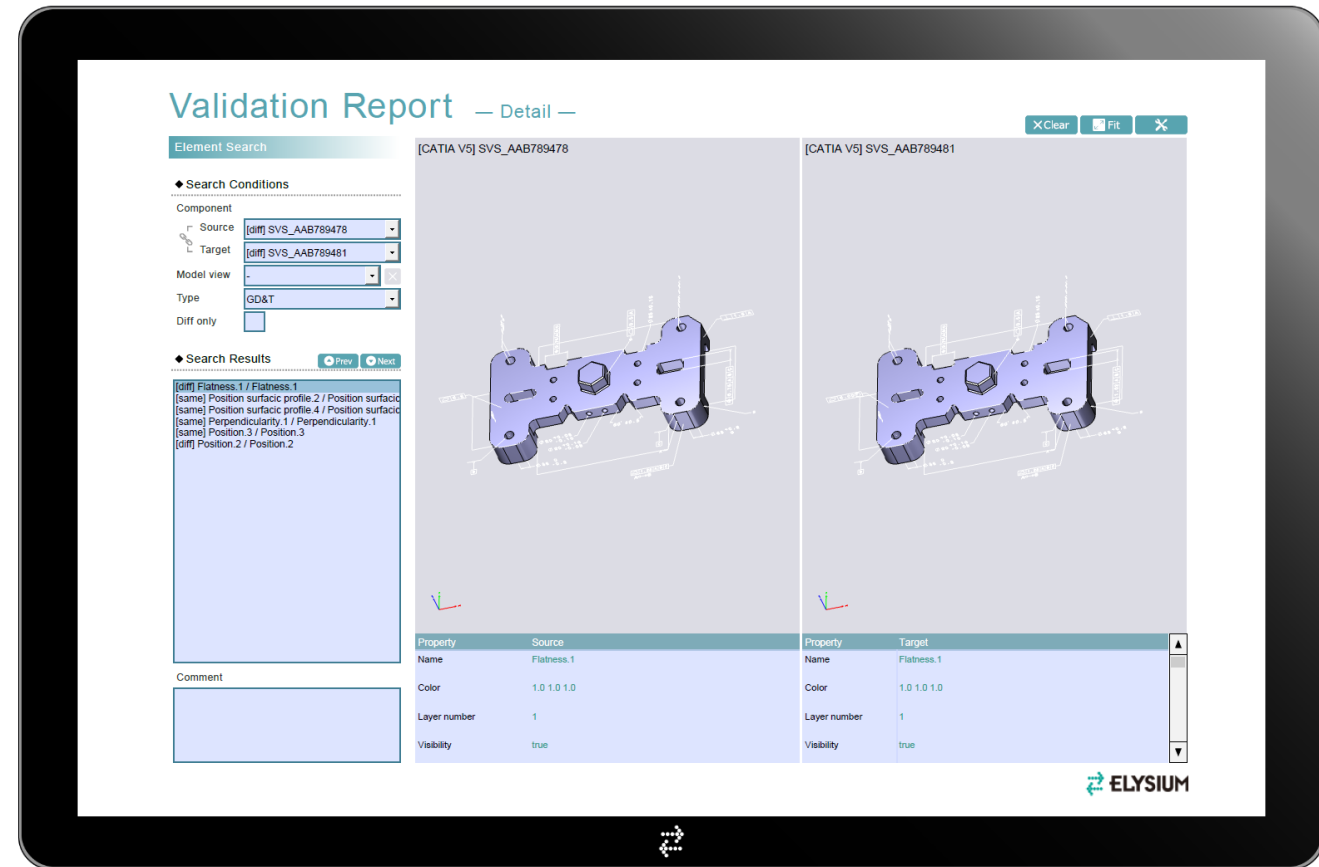
Detecting Differences

Elysium will examine files and provide comparison of geometry, PMI and attributes. Easily navigate to the difference with a click of a button.



Shareable Report

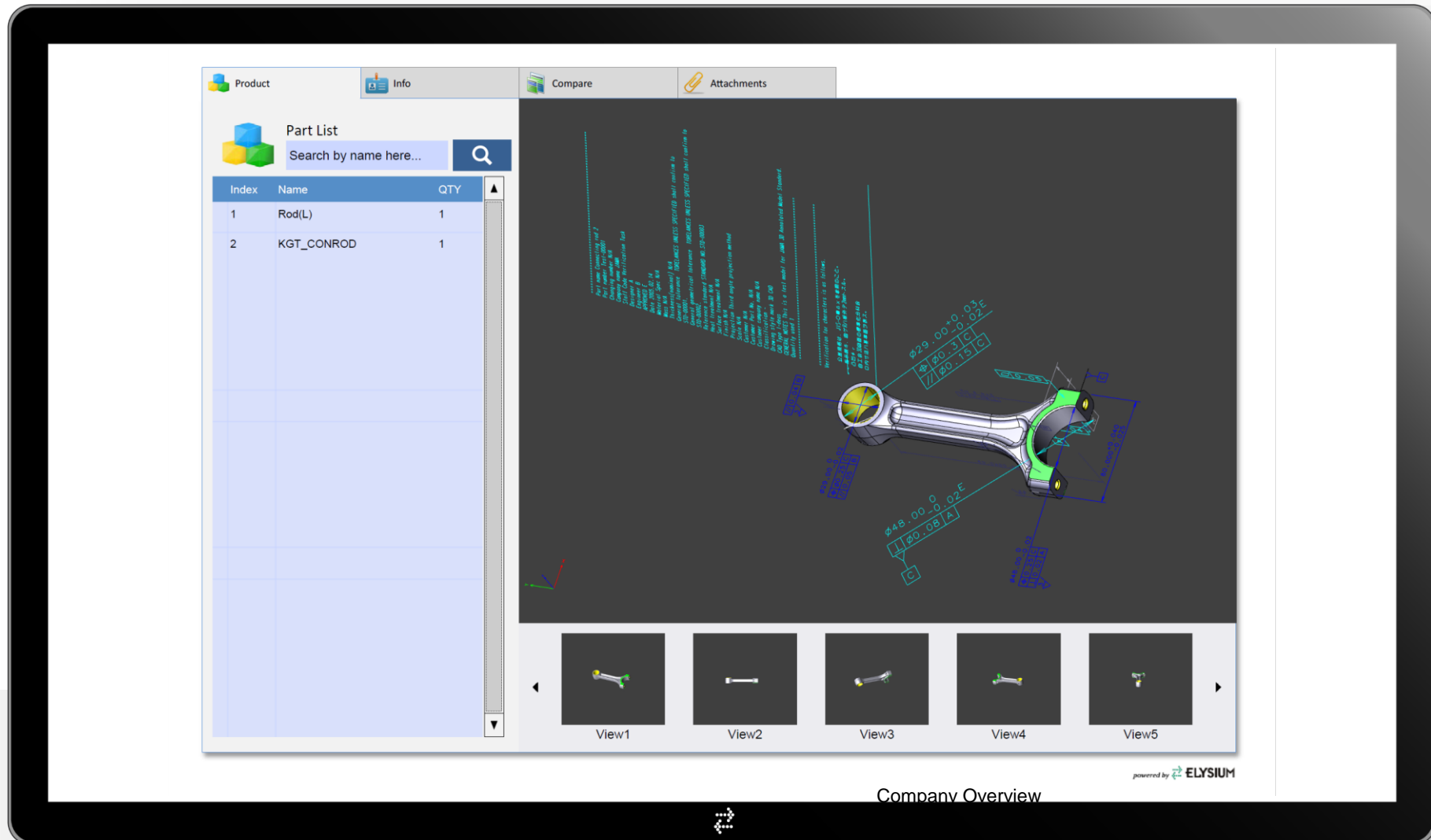
Elysium provides validation reports in 3D PDF, HTML, and XML for easy share across organization(s). No CAD system required.



Data Packages

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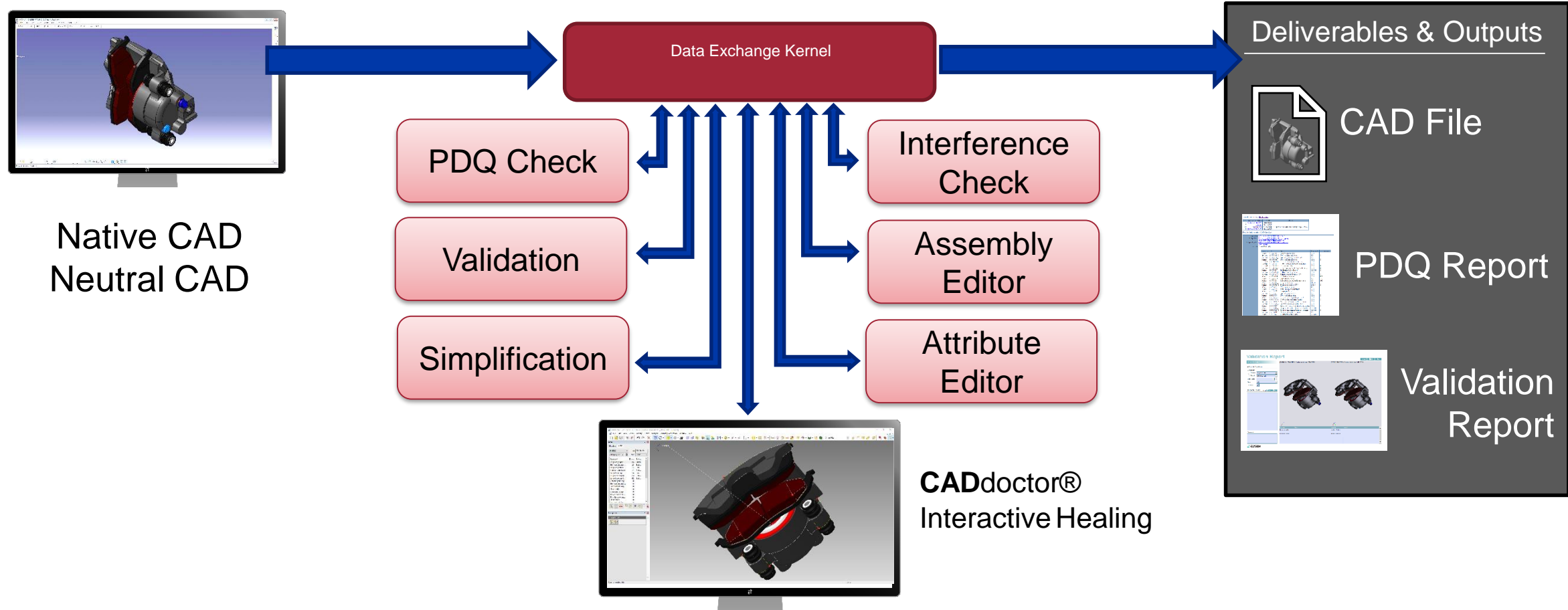
Create easy to share Data Packages that includes 3D model viewing and ability to add support docs (spreadsheets, BOM, etc.)



ASFALIS™ Functionality

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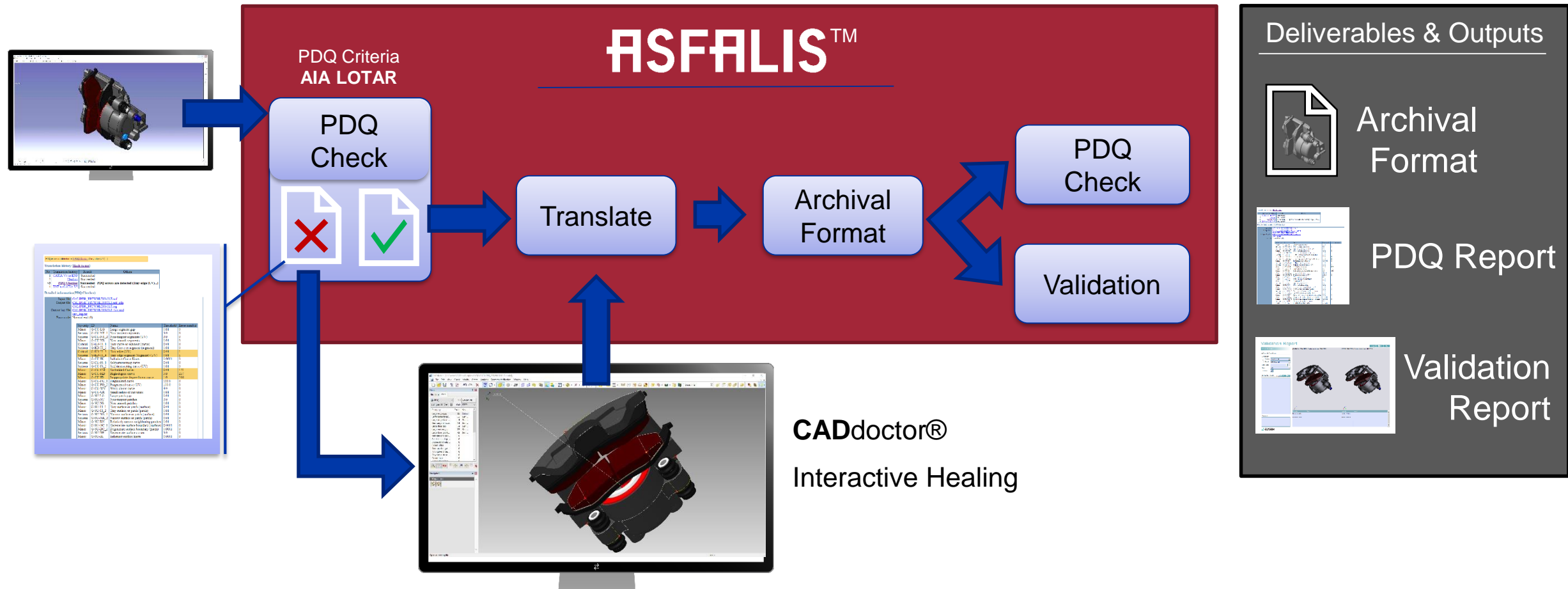
Enterprise system for automated translation and optimization of 3D CAD data



Archival Process

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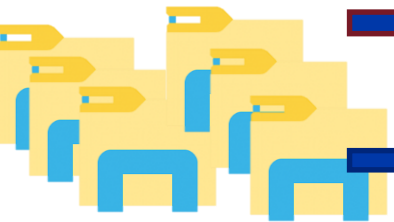
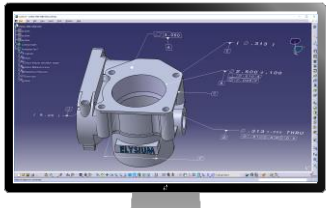
Elysium's technologies can simplify your archival process for accurate and shareable documents for future use



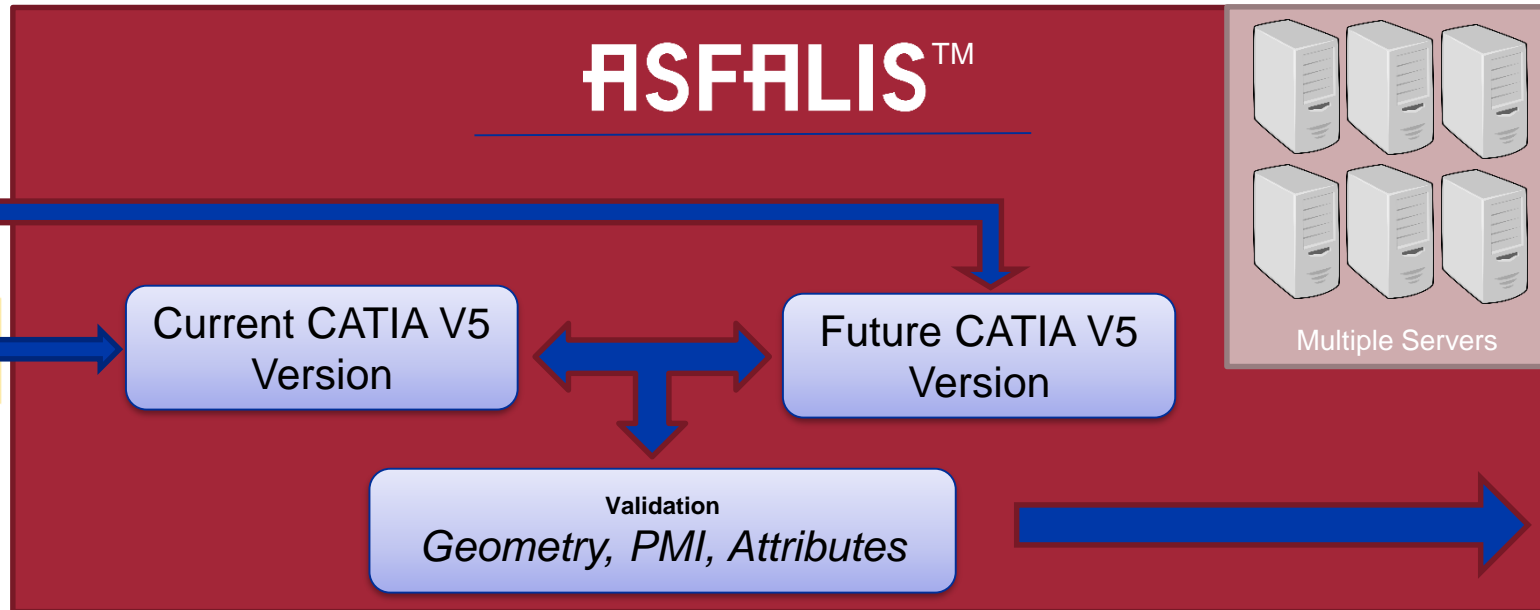
CAD Version up Validation

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Aerospace OEM



Current CATIA V5 Version



Deliverables & Outputs



Machine
Readable
Summary
Reports



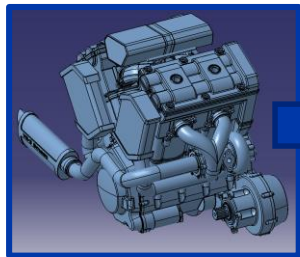
Validation
Reports



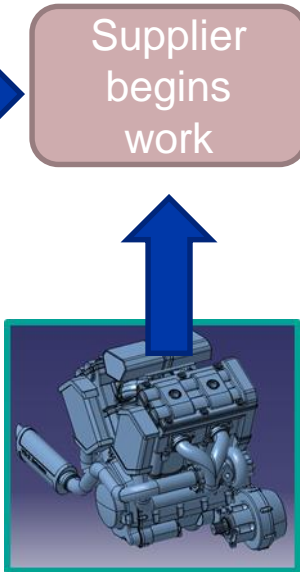
Work in Progress [WIP] Validation

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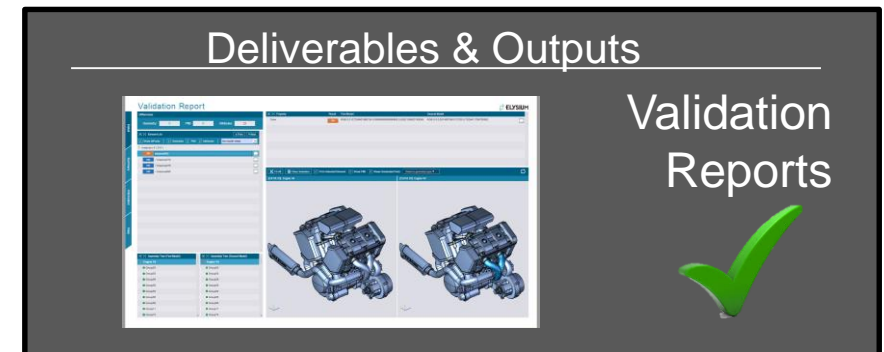
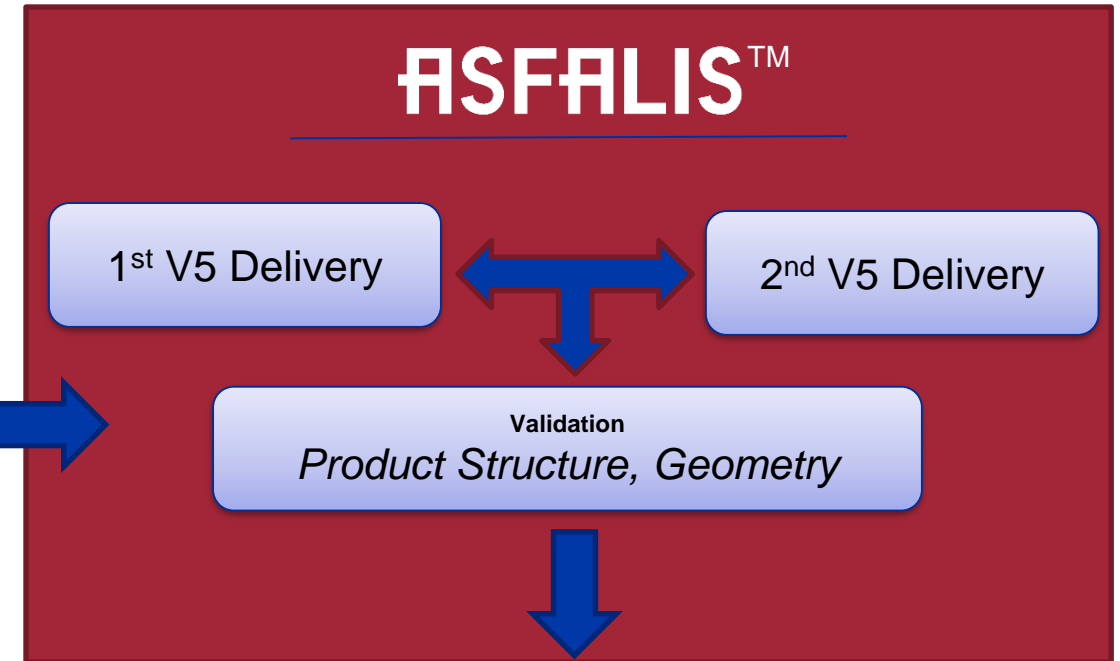
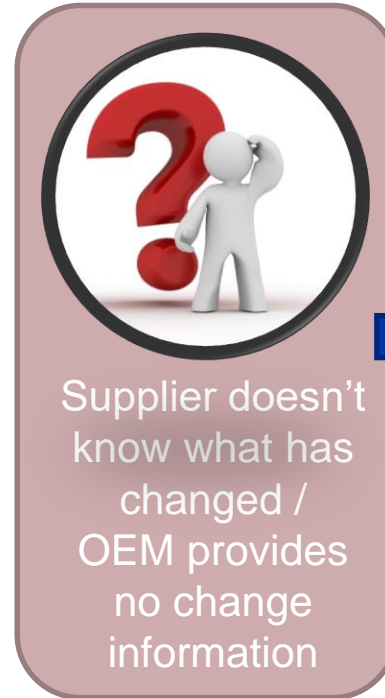
Tier One Automotive Supplier



Initial CATIA V5
OEM Delivery



Additional CATIA V5
OEM Delivery



Engineering Change Order [ECO] / Change Request [CR]

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Military Supplier

Proposed Creo Release
"Revision B"

Initial Creo Release
"Revision A"

Engineering wants
to make a change

Publish Approved Change
Request to Appropriate
Groups

ASFALIS™

Creo "Rev A"

Creo "Rev B"

Validation

Product Structure, Geometry, PMI, Attributes

**Dynamically Build
Change Request:**
Filter / color code
approved &
unacceptable
changes

Deliverables & Outputs

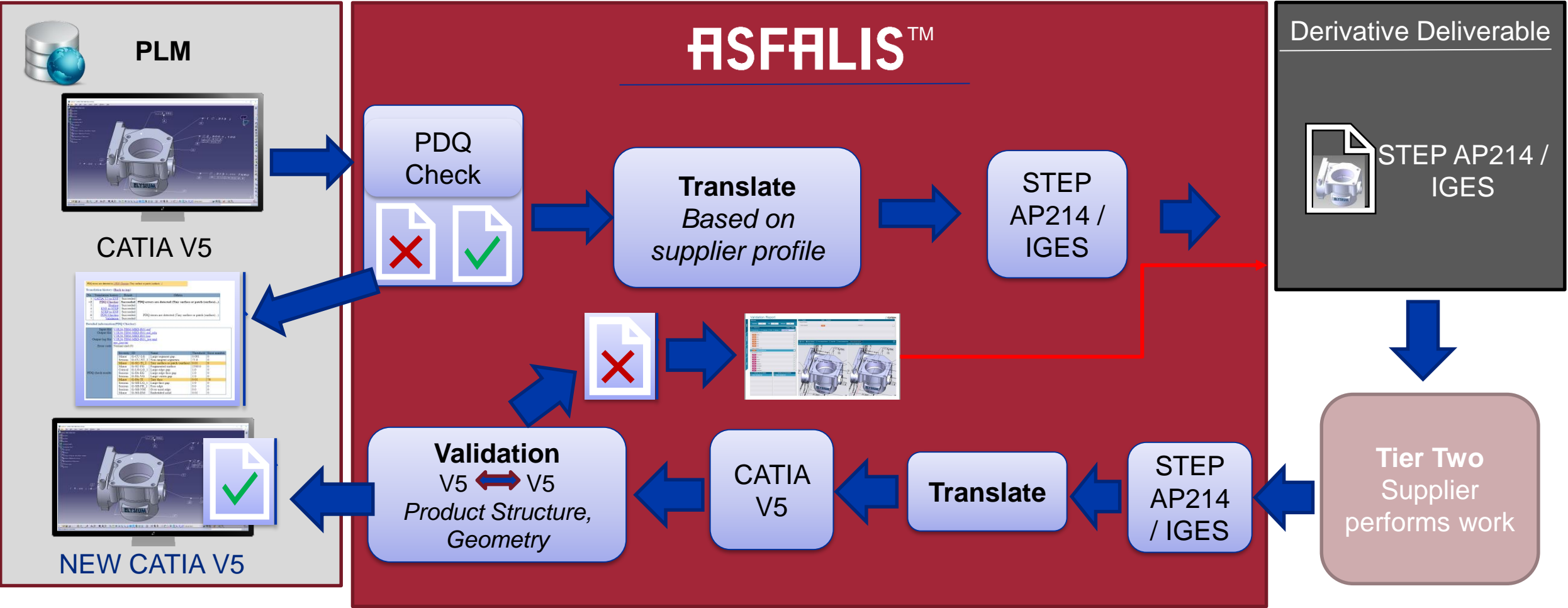
Validation
Report



Supplier / OEM Collaboration [PDQ + Validation]

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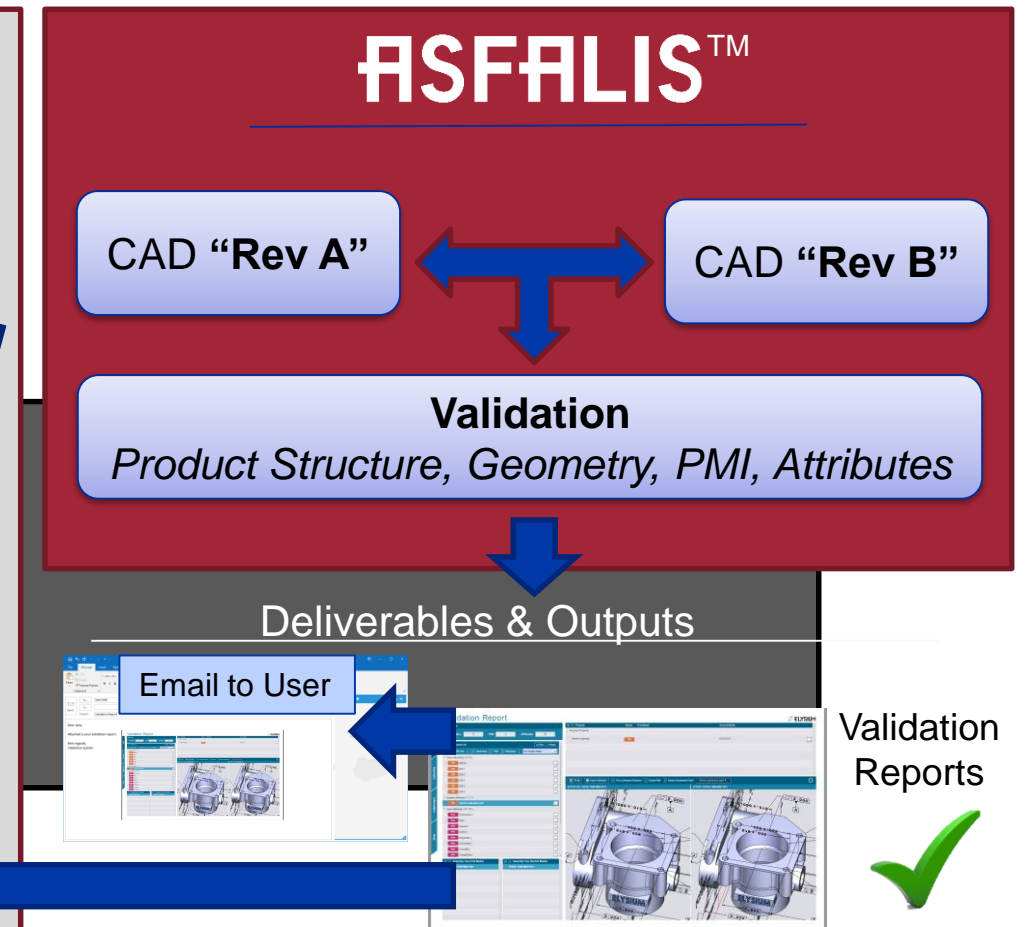
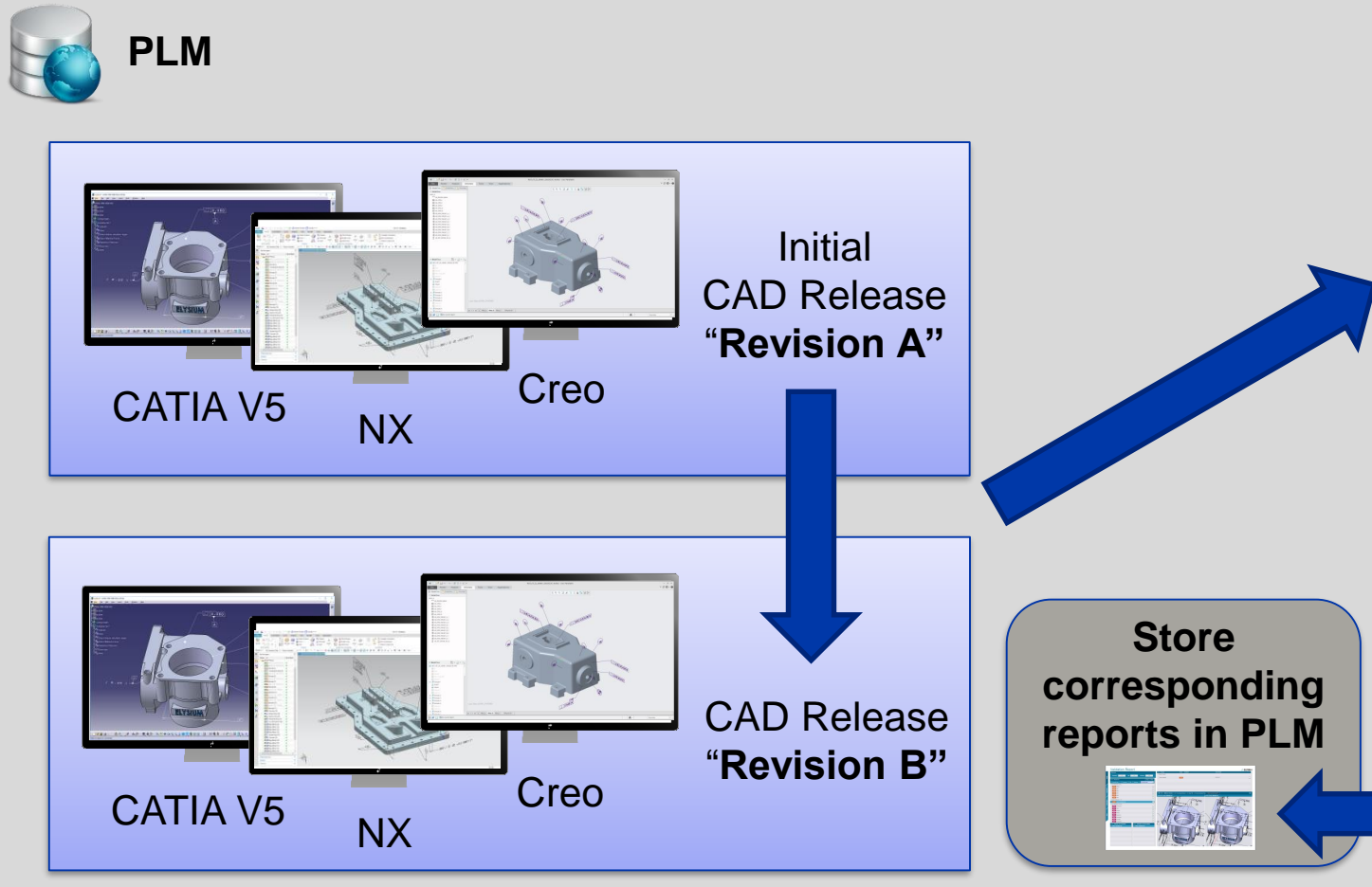
Tier One Automotive Supplier



ECO / Derivative CAD / PDQ in PLM

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Large aerospace supplier



ECO / Derivative CAD / PDQ in PLM

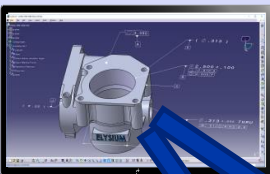
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Large aerospace supplier

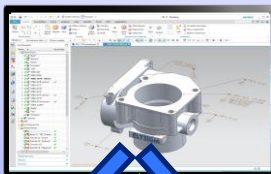


PLM

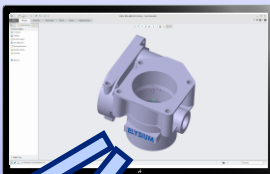
CAD Release Revision A



CATIA V5



NX

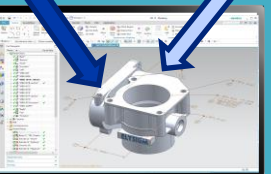


Creo

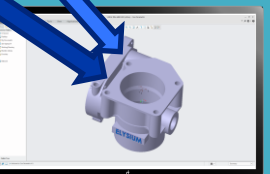
CAD Derivative Revision A'



CATIA V5



NX



Creo

Store corresponding reports in PLM



ASFALIS™

CAD Rev A

Derivative CAD Rev A'

Validation

Product Structure, Geometry, PMI, Attributes

Deliverables & Outputs

Email to User

FAIL

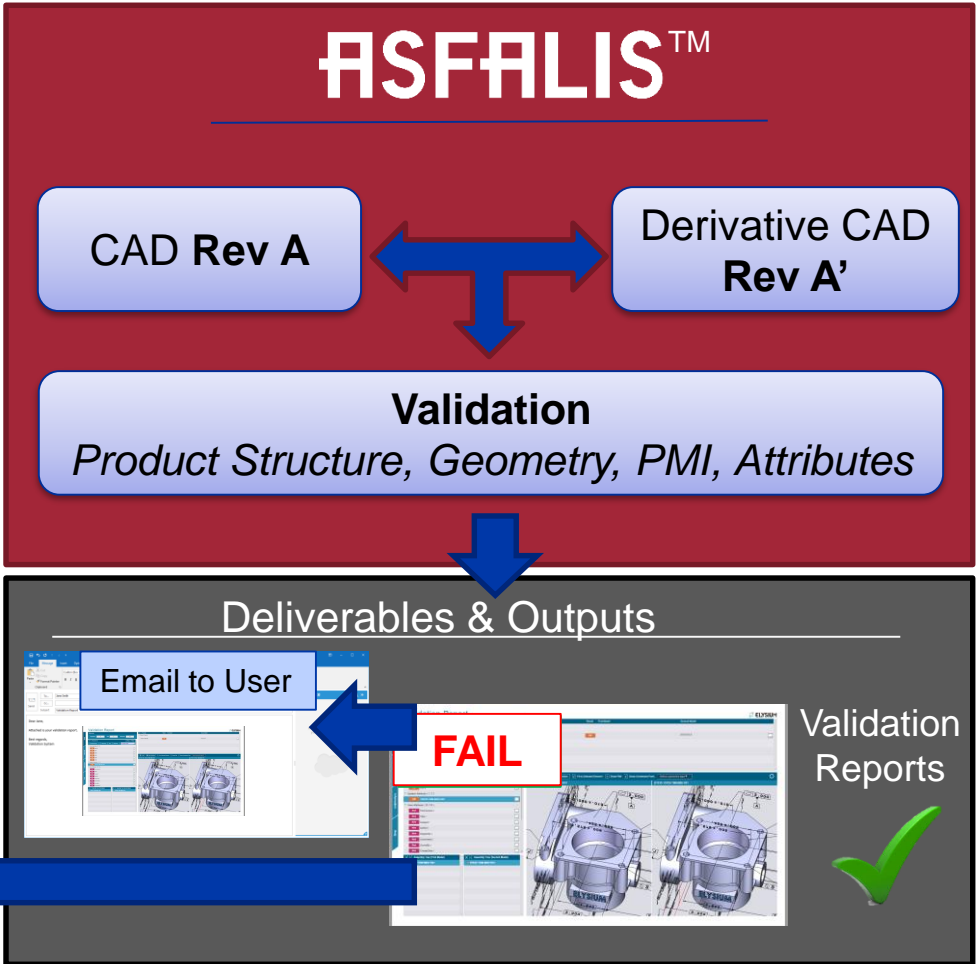
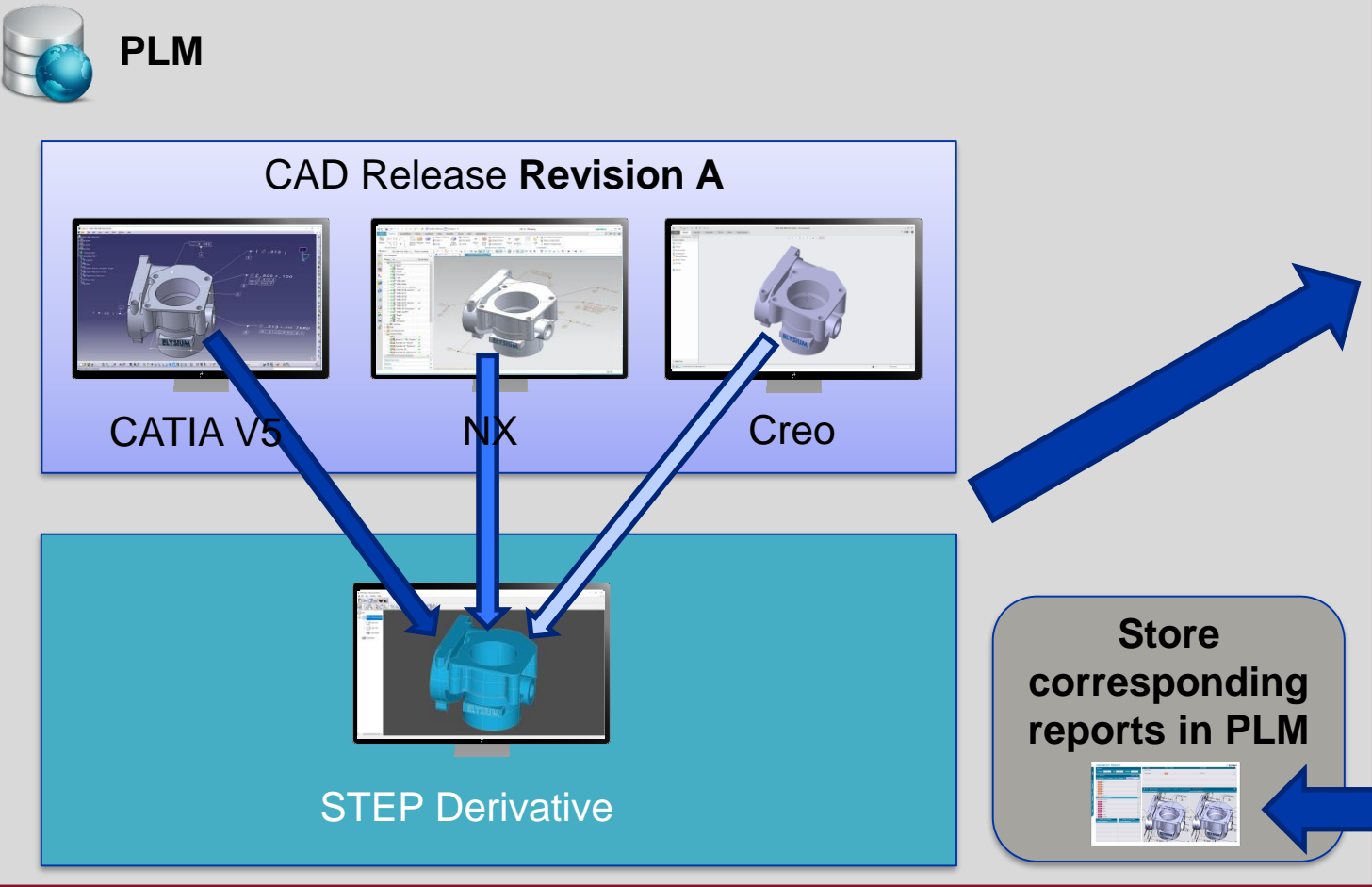
Validation Reports



ECO / Derivative CAD / PDQ in PLM

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Large aerospace supplier



ECO / Derivative CAD / PDQ in PLM

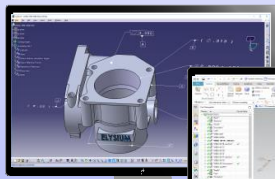
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Large aerospace supplier

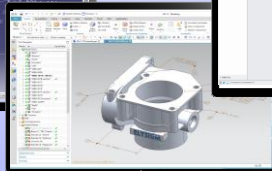


PLM

CAD Release **Revision A**



CATIA V5



NX

Creo

CAD Rev A

ASFALIS™

PDQ Check

- Based on target CAD
- Based upon OEM standards
- Based on industry standards:
MIL-STD 31000A

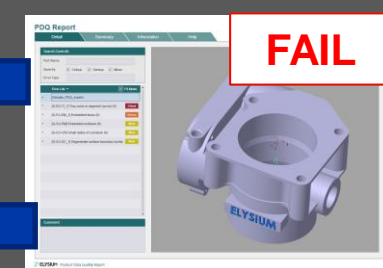


Store corresponding reports in PLM



Deliverables & Outputs

Email to User



PDQ Reports



Thank you. Stop by our booth for more!

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Ready-to-go software with powerful results

CADdoctor®

PDQ checking, Auto/Interactive Healing, Optimizing, and Translation

ASFALIS™

Enterprise-level PDQ checking, Automatic Healing, Optimizing, Translation, and Validation. Designed for heavy volume data.

CADfeature™

Feature-based translation with 2D drawing associativity

DirectTranslator™

Simple to use,

InfiPoints™

Point cloud handling software to register, process, analyze and export to CAD and BIM software

