

**TECHNIA**  
ADDNODE GROUP

## xCompare

V5-V5, V5-JT, V5-SMG Validation

EXPERIENCE MATTERS



# Engineering Data Quality

Ready for Release  
Collaboration & Data re-use  
Industry Standards & Homologation  
Documented Quality / Change reports





# Manage Model Modifications

V5-V5, V5-JT, V5-SMG Validation

# Challenges in engineering change reviews

Increased model complexity

Number of revisions

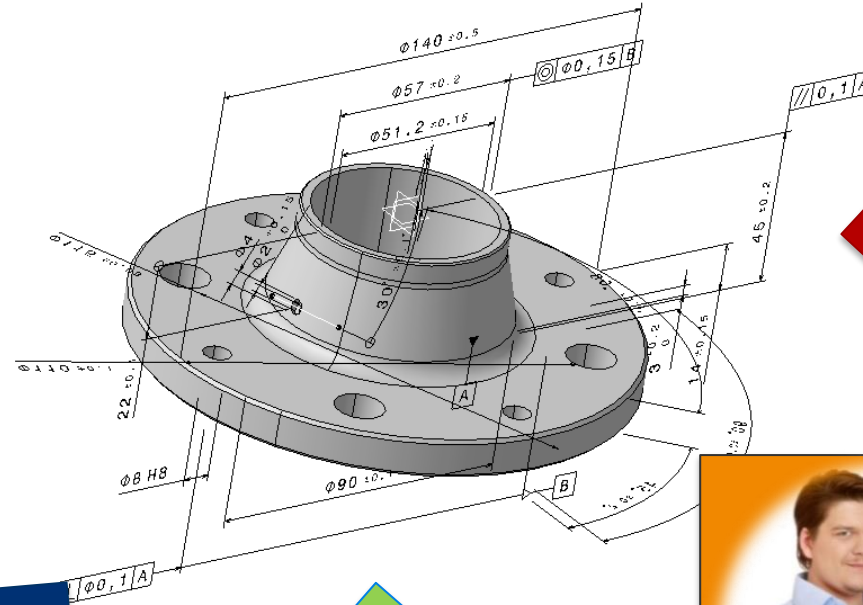
Poor communication

Different process knowledge

Language barriers

Cultural differences

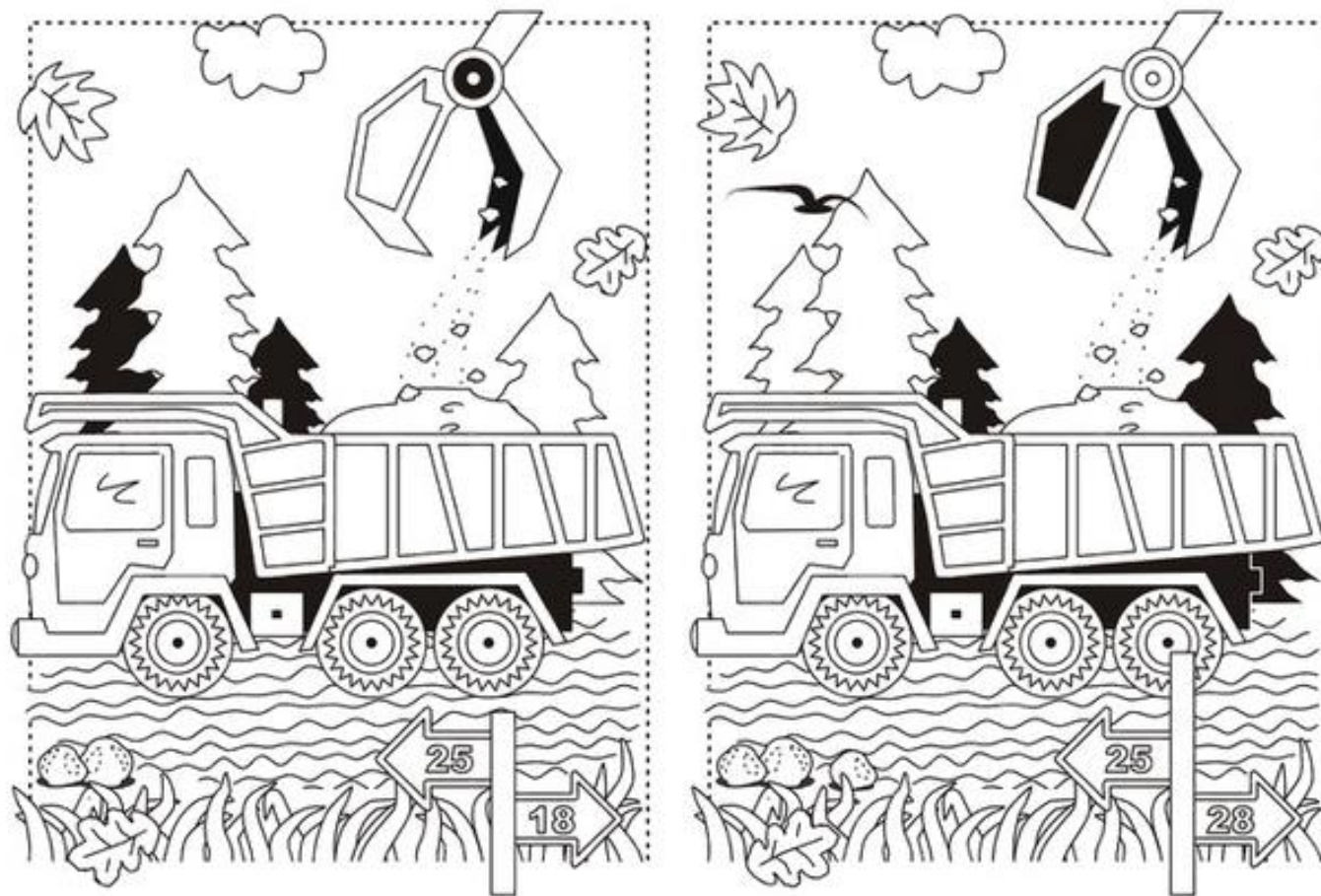
No tools

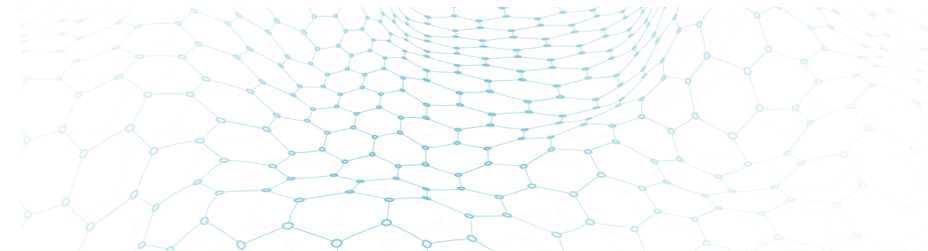




# Fun or frustrating?

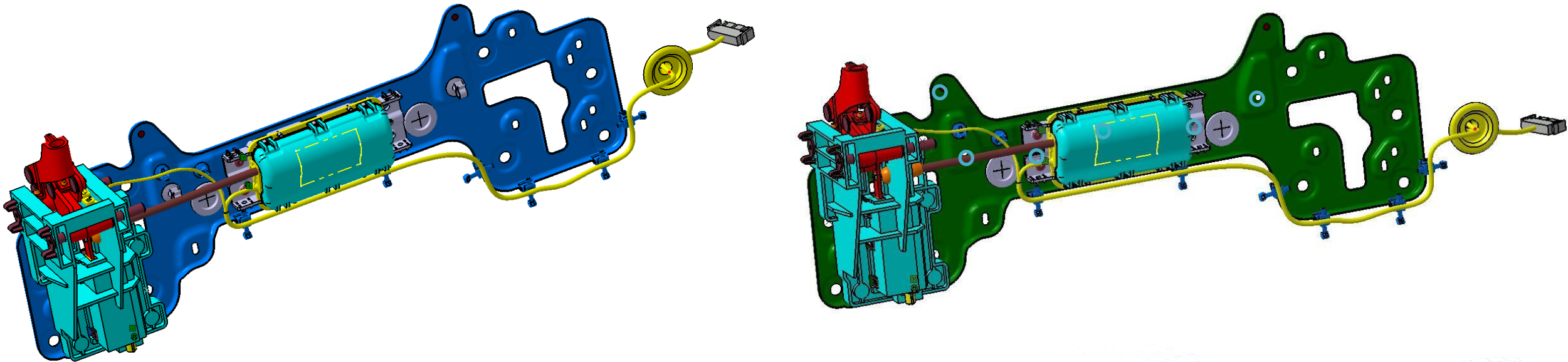
Find 10 differences



[illegible]

# Fun or frustrating?

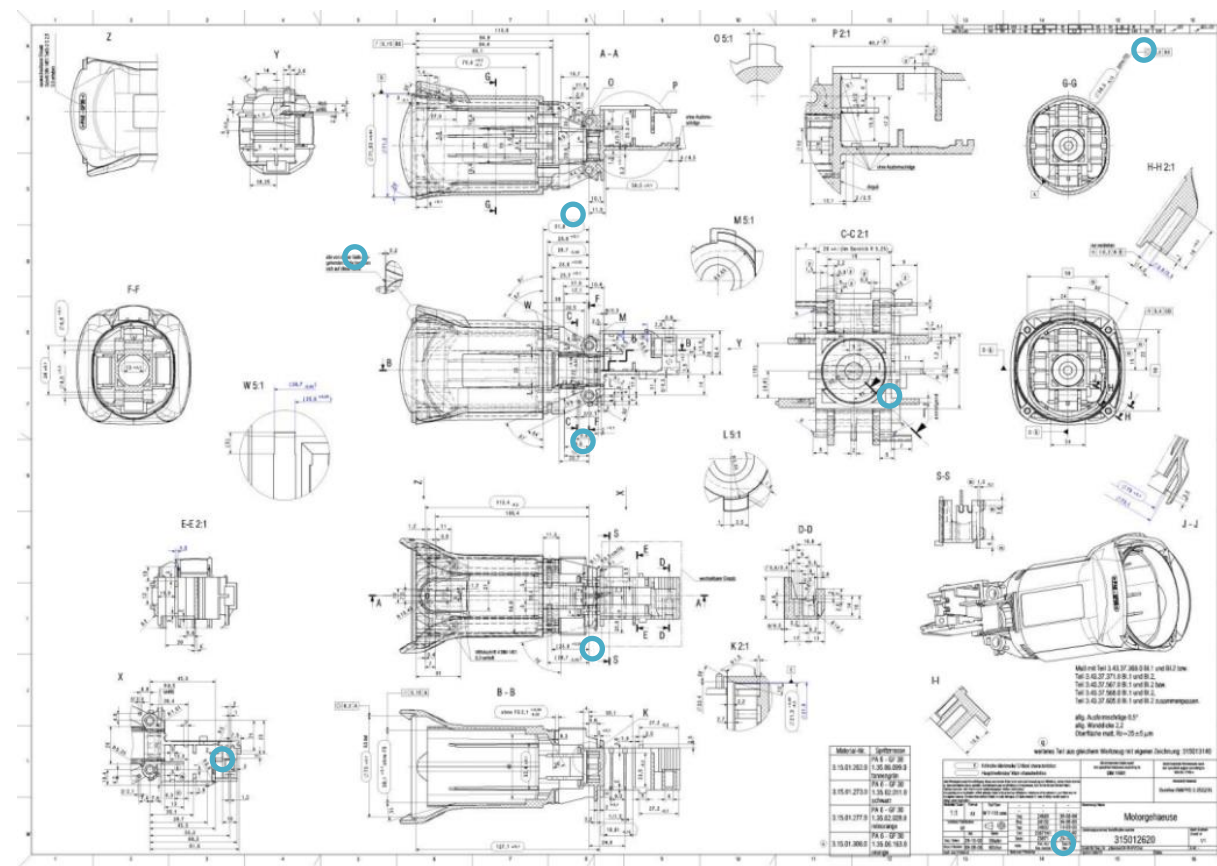
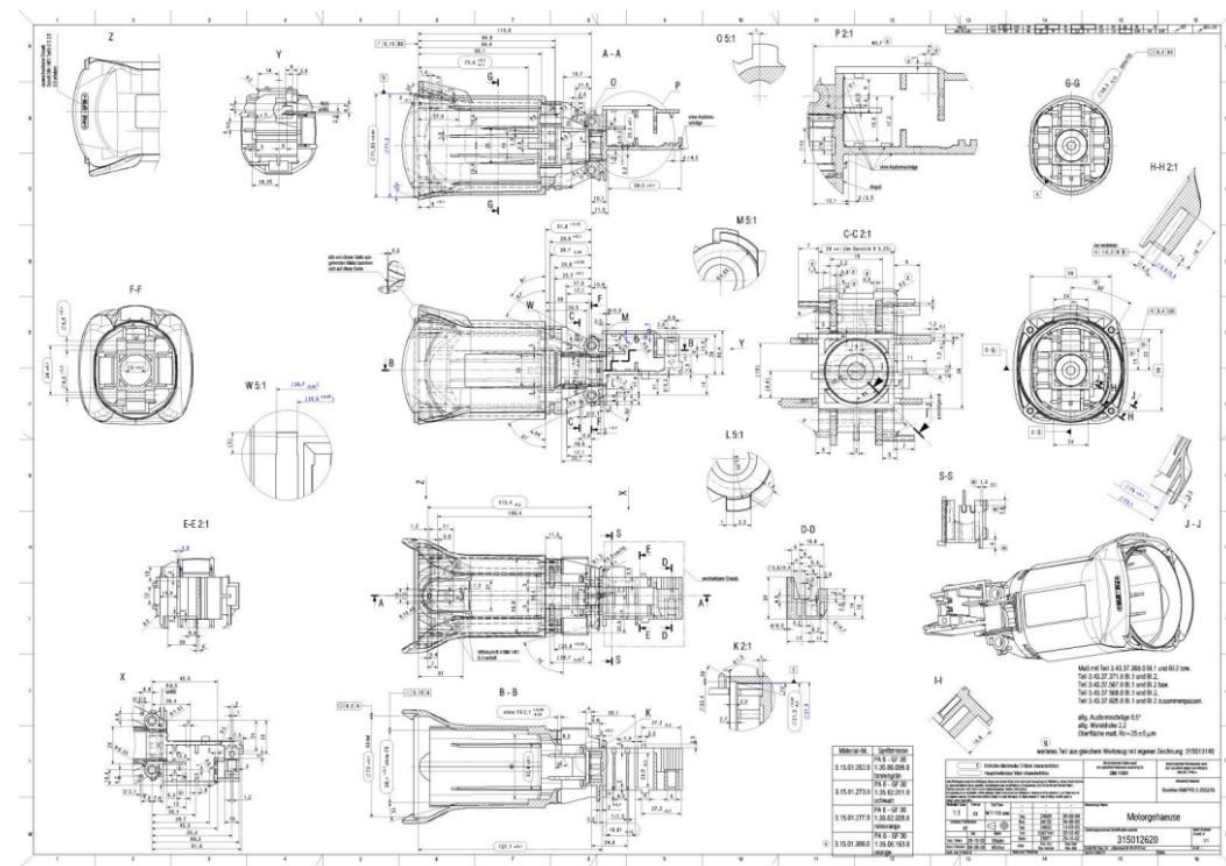
## Assemblies





# Fun or frustrating?

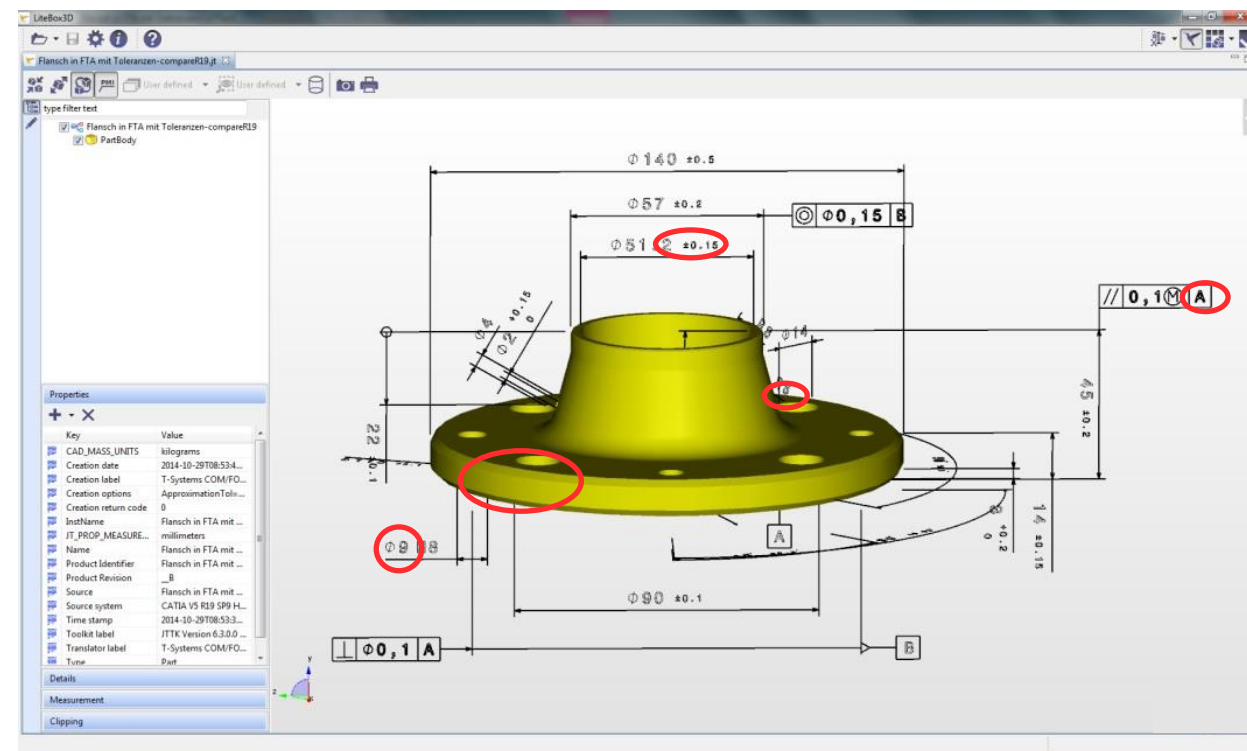
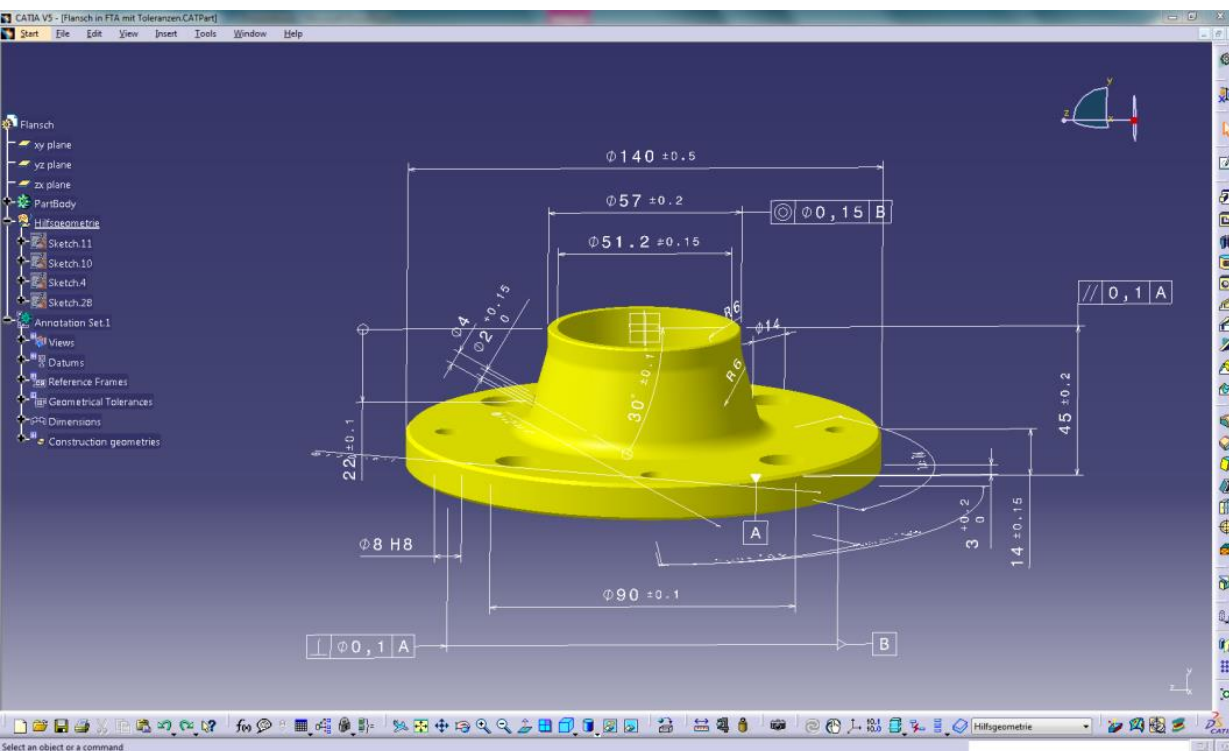
## Drawings





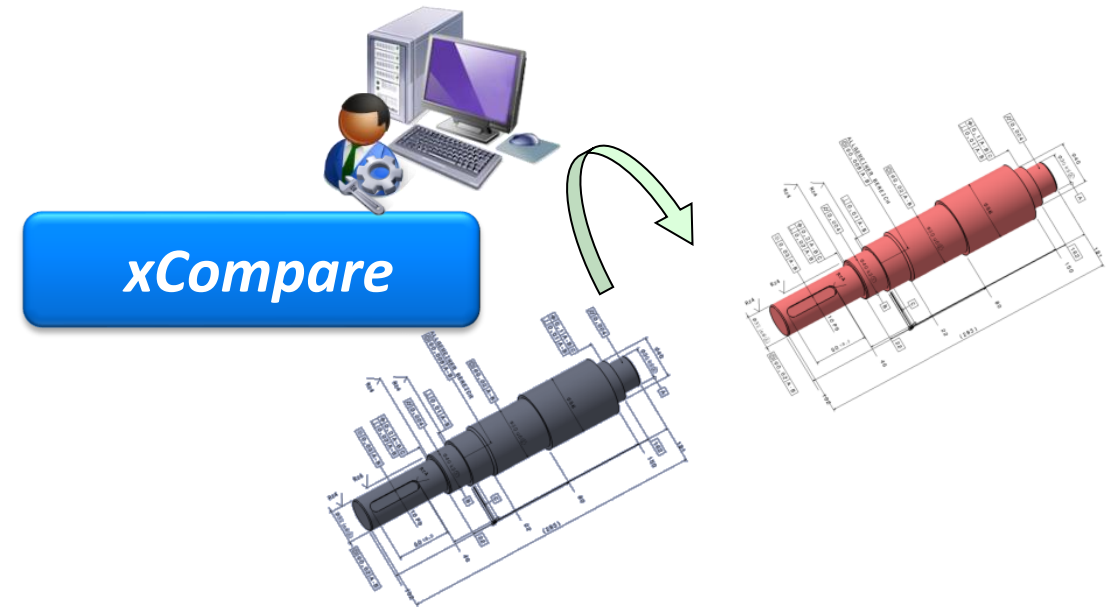
# Fun or frustrating?

## Data Translation



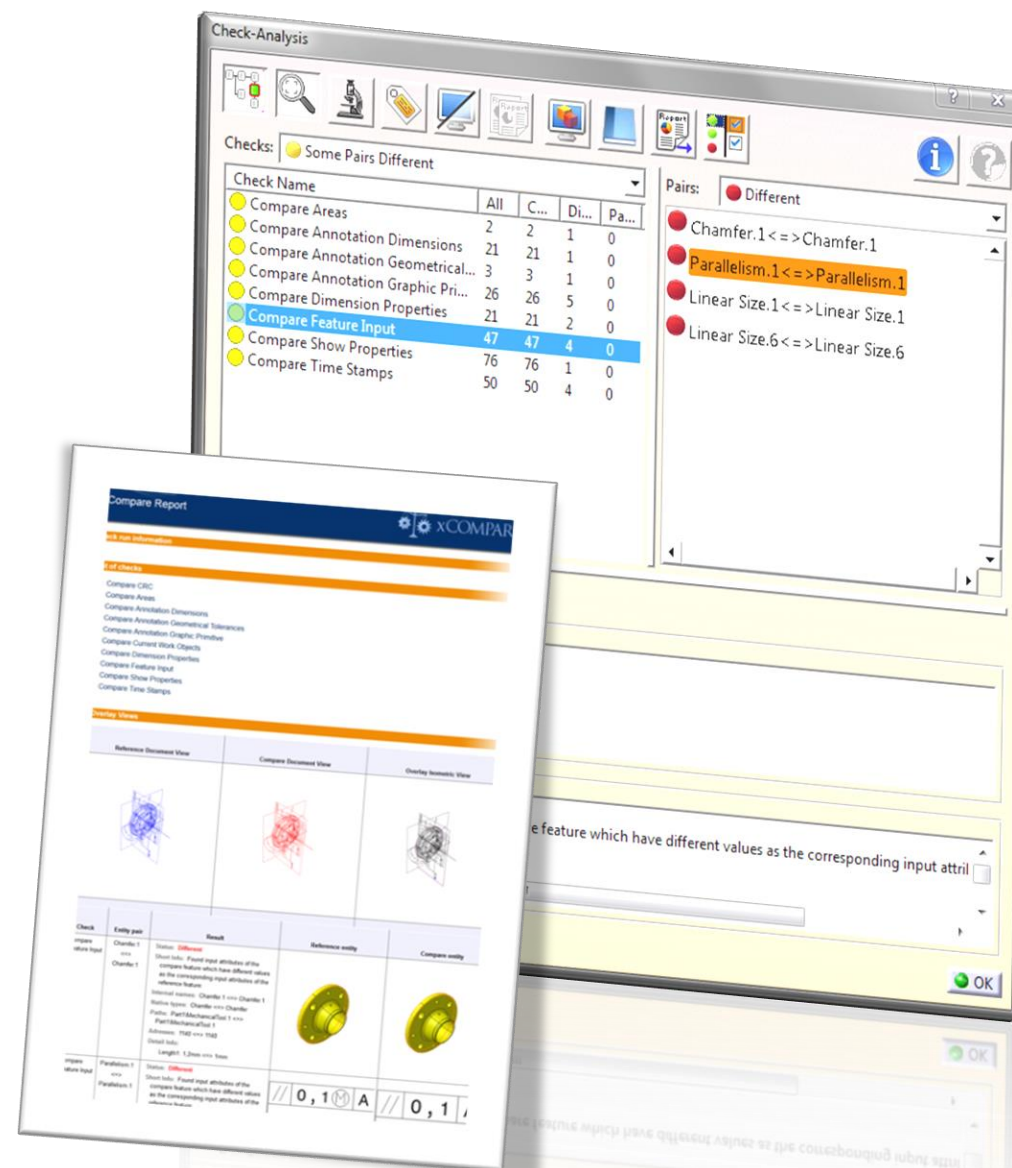
## xCompare - See the difference

- Find and document differences between two CAD data
  - What has been modified between two revisions?
  - Was the conversion successful?
  - Fulfill legal or company requirement to document differences
- Products for
  - V5 / V5: comparison of two CATIA V5 file (product, parts, drawings, cgr)
  - V5 / JT
  - JT / JT
  - V5 / SMG (CATIA / 3DVIA Composer)



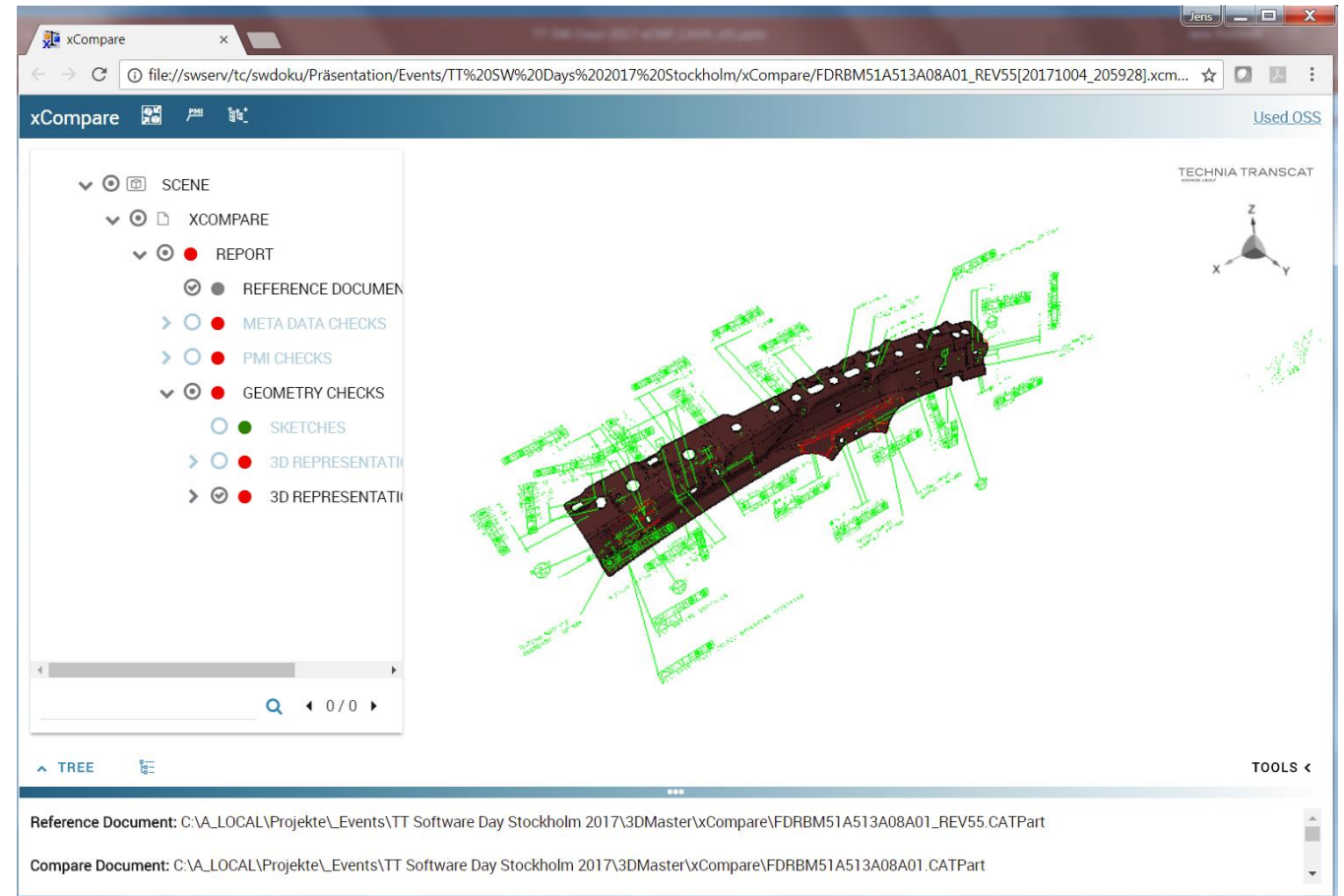
## Fast and reliable...

- **Fully integrated with CATIA V5**
- Support of CATPart, CATProduct, CATDrawing and Cgr
- **Interactive and Batch Comparison**
- Feature-based comparison detects **ALL design changes**, including geometric, topologic and annotation (FT&A)
- **Build your own validation set out of 50 checks**
  - new / removed / renamed features
  - modified feature input
  - modified graphical properties
  - modified parameters
  - changes in geometrical parameters
  - area, center of gravity
  - differences in properties
  - modified views & sheets
- **Detailed reports**
  - xml and html with screen captures
  - html with 3D visualization



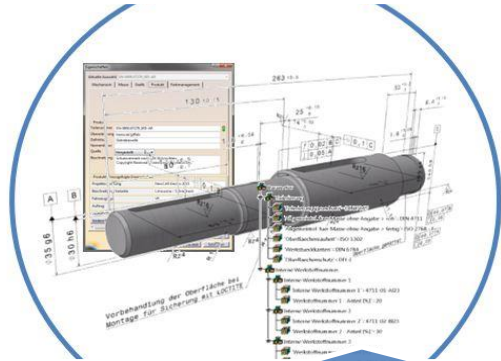
## 3D Report

- Display with any Internet Browser – w/o installation of Plugins
- Very good User Experience
- Customizable Templates
- 3D content is tessellated – no exact geometry
- Password protection possible





# Some use cases



3D Master



Design review



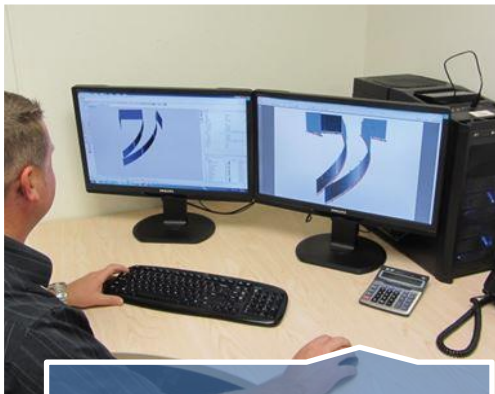
Design → Tooling



OEM → Supplier



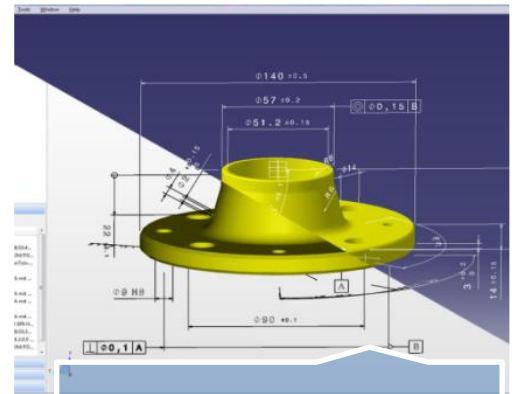
3D Printing



Redesign of parts



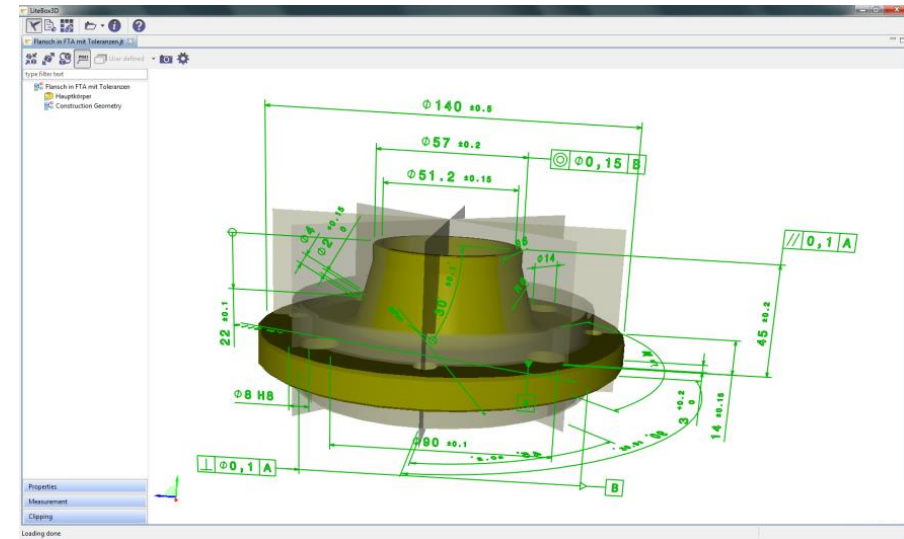
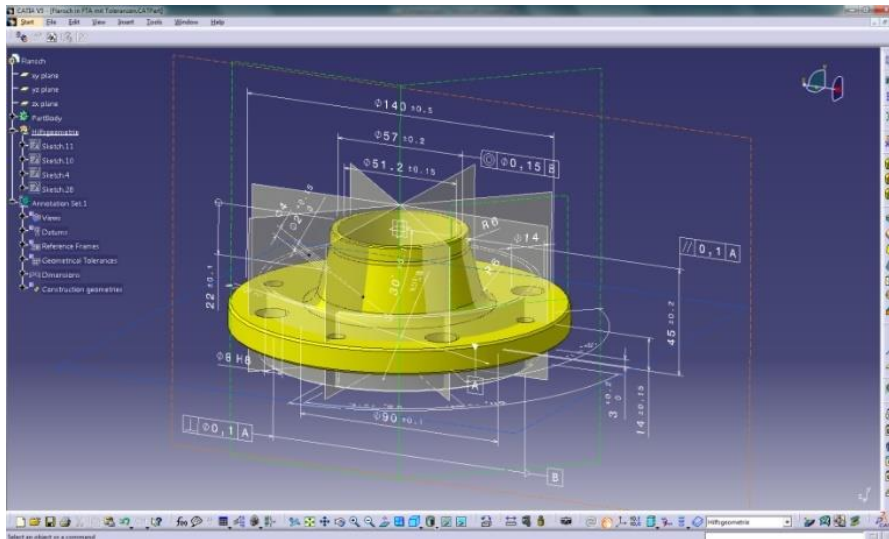
Design → Shop floor



Data Translation

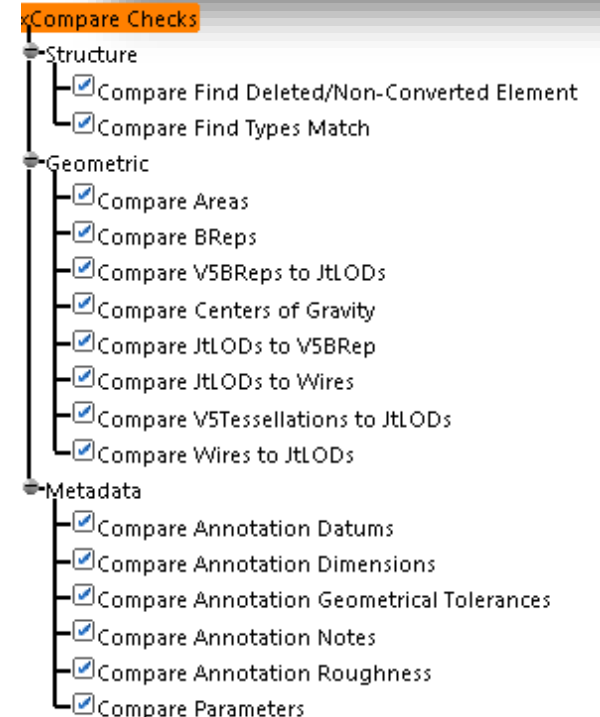
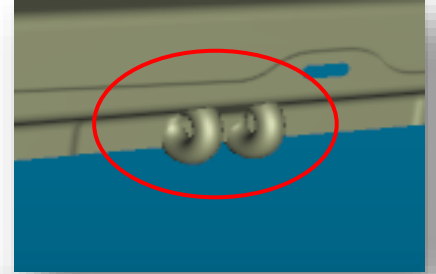
## Why Model Validation?

- **Data translation validation** – Avoid unacceptable differences caused by translation
  - Identify changes introduced while translating a CAD model into another format. Errors can be found easily before the model is moved into downstream
  - Fulfill legal or company requirements for documentation

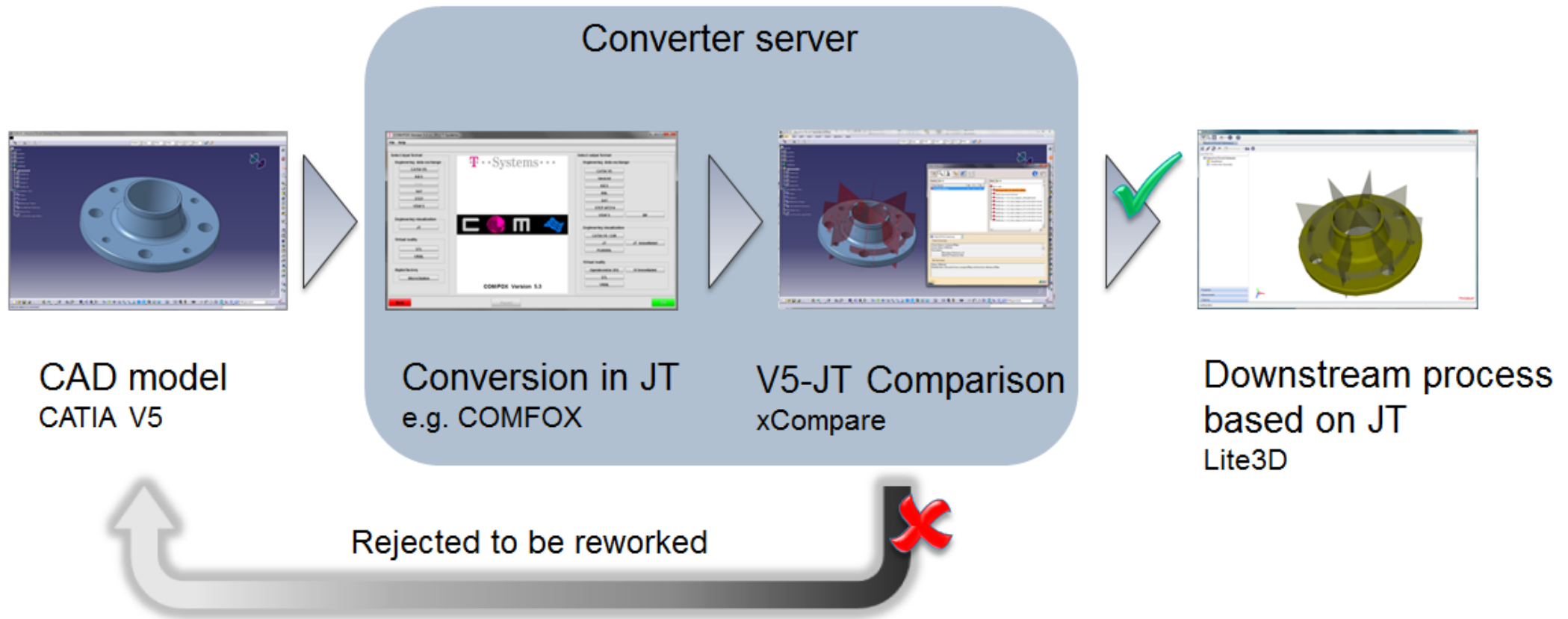


## Successful Translation?

- Verification of the conversion process from CATIA V5 into JT
  - Important for downstream processes, Long Term Archiving, etc.
- Native validation without data translation
  - CATIA model is read through CAA
  - JT through TechniaTranscat own ISO based toolkit
  - Visualization of differences inside of CATIA
- Dedicated for geometrical comparison between V5 and JT Brep & LODs
  - Are there differences between V5 and JT B-Rep (JT & XT)?
  - Missing faces, Wrong face limitation, etc.
  - Do the LODs represent the V5 geometry with required accuracy?
  - 5-7% of all converted models having differences
- PMI comparison based on graphic representation and semantic details
- Configurable for different conversion settings
- XML Report for documentation



## Process implementation

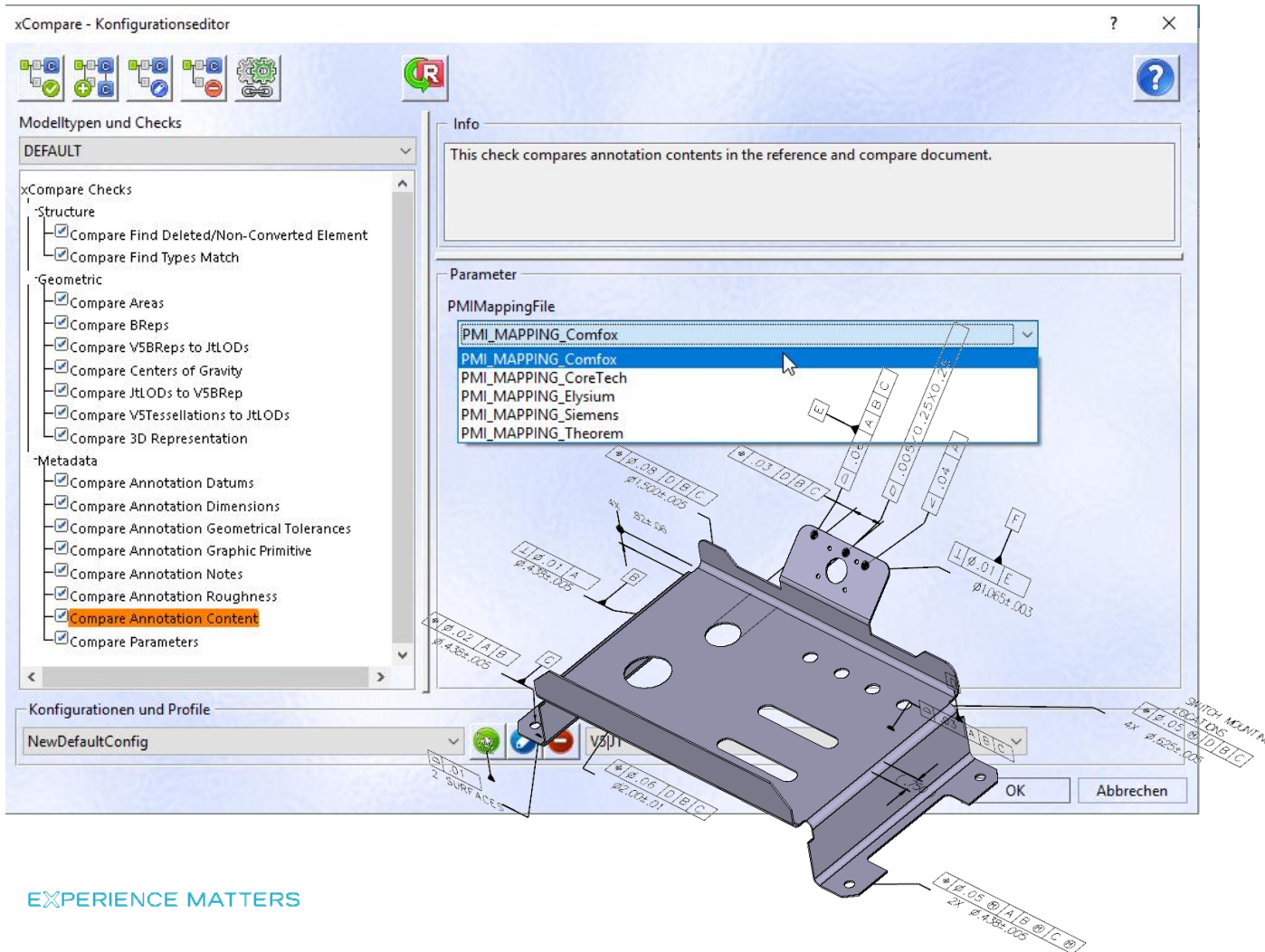




# xCompare V5/JT PMI Comparison

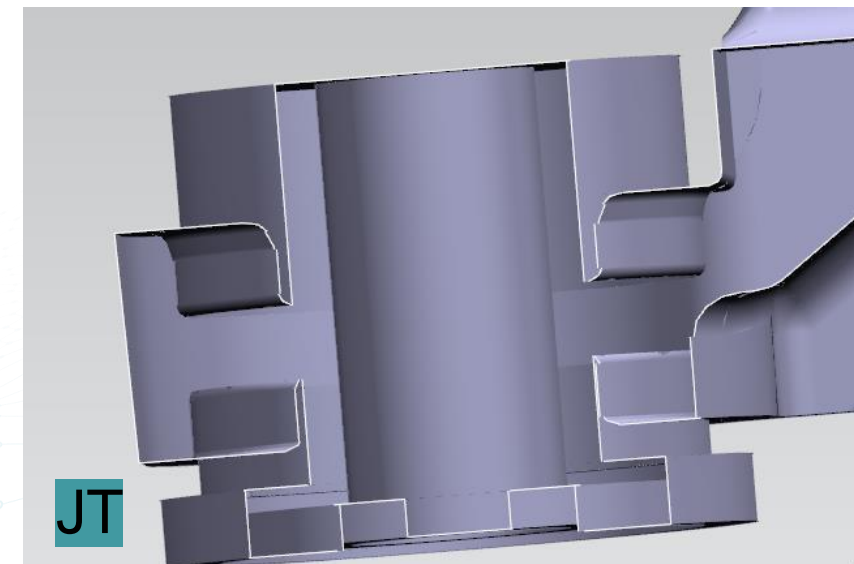
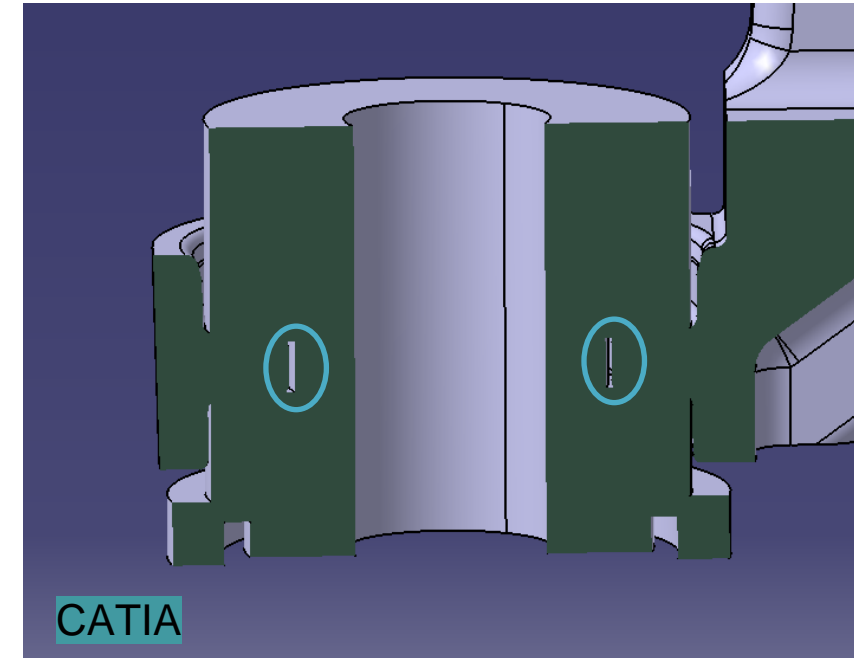
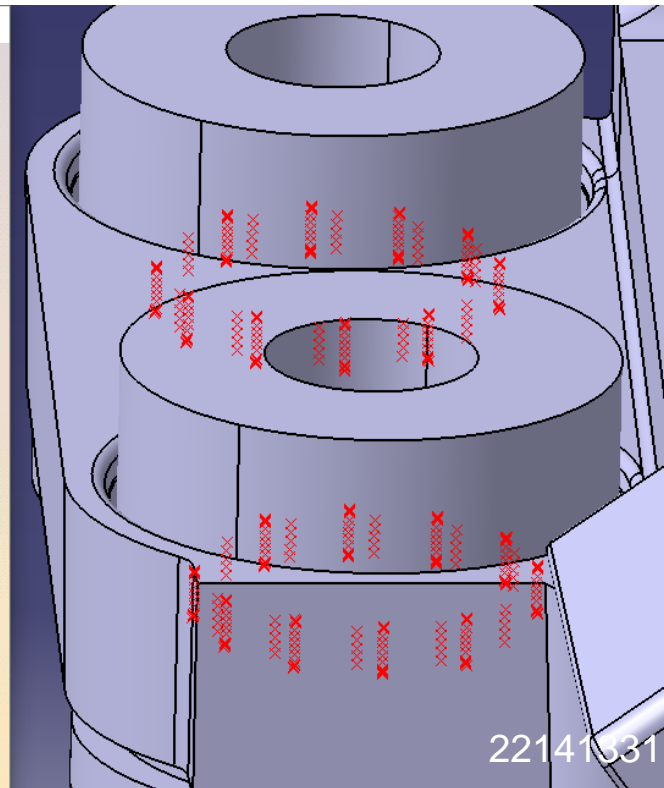
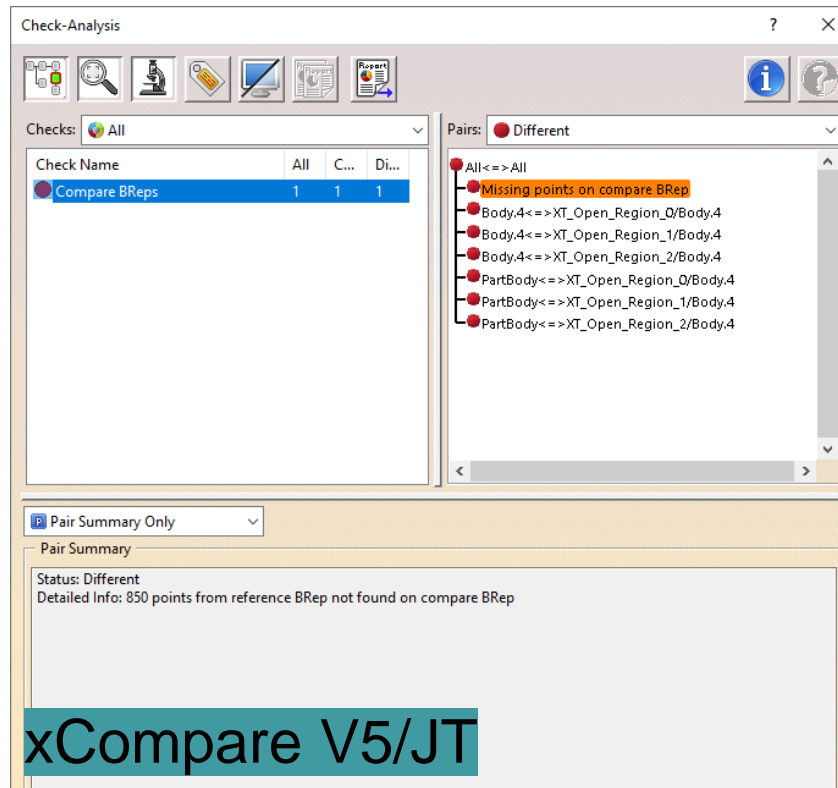
PMI comparison check based on semantic content  
- flexible customization

3D Representation check with better visualization of geometrical differences

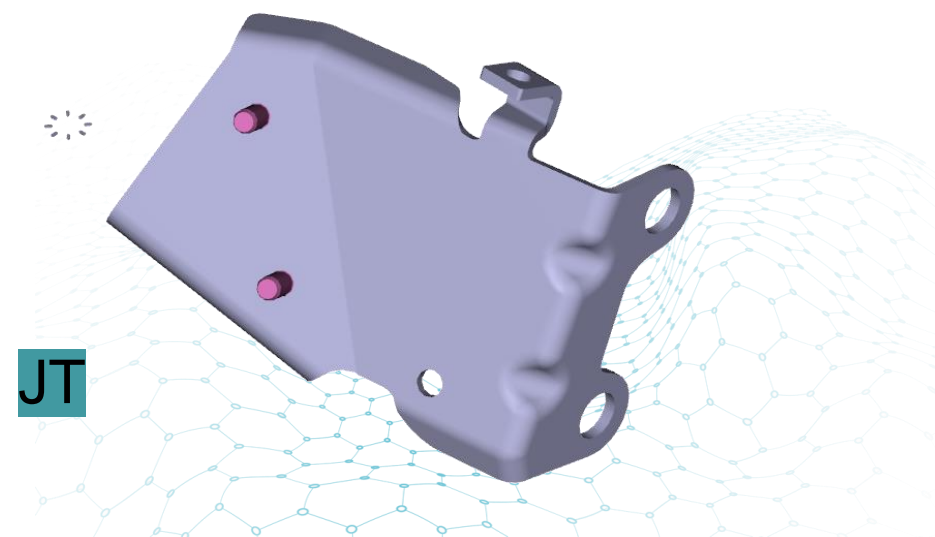
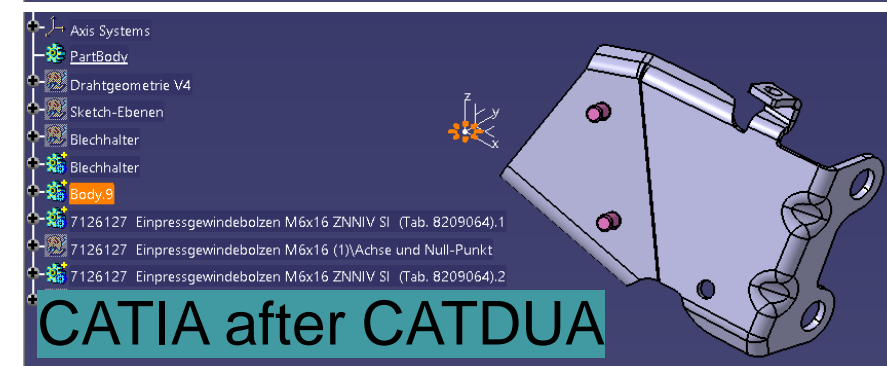
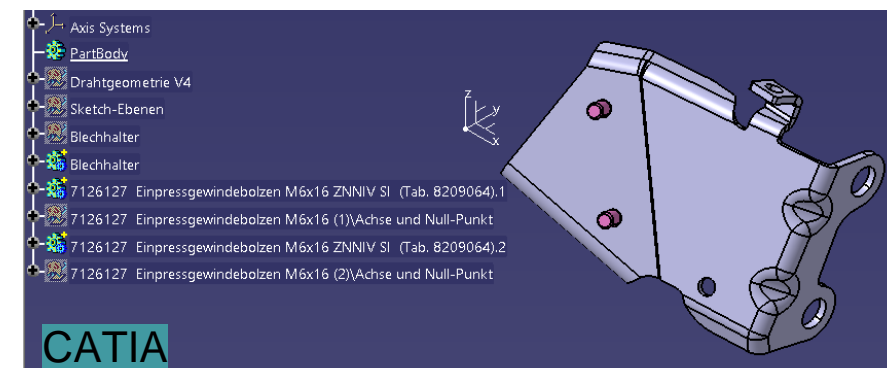
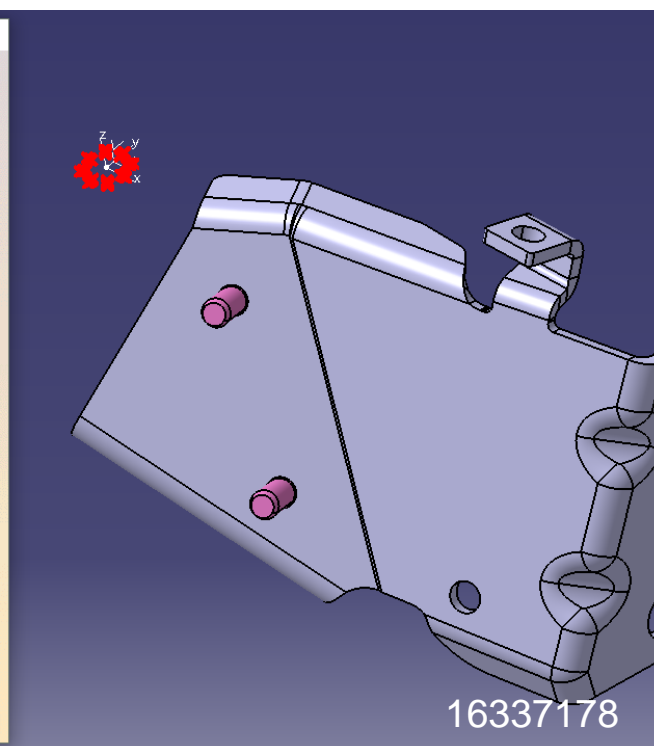
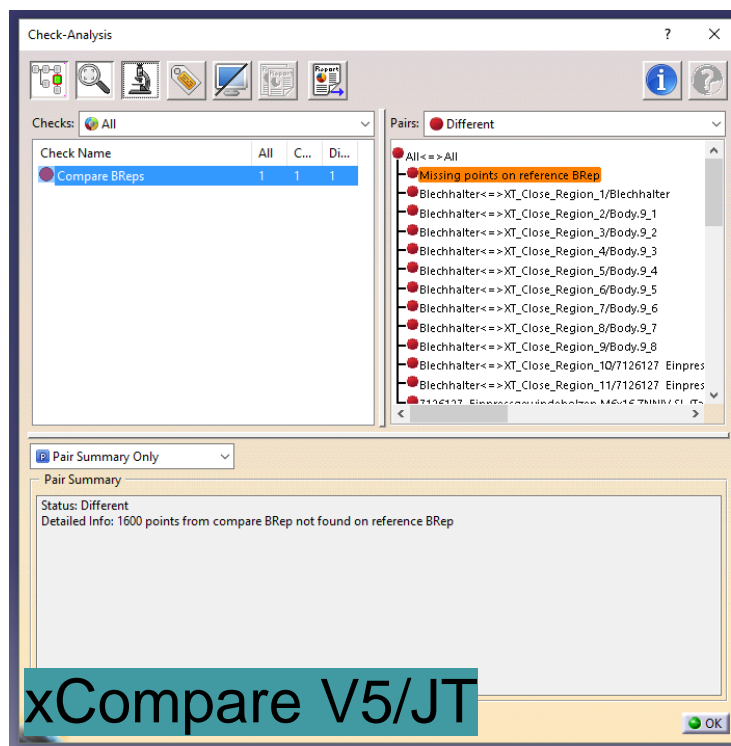


```
<PMI PMIType="Dimension">
  <Attribute DocumentType="V5">
    <RefKeyName DataType="REAL" Units="INCH">Measured value</RefKeyName>
    <CorrespondingAttribute DocumentType="JT">
      <KeyName DataType="REAL" Units="MM">value</KeyName>
    </CorrespondingAttribute>
  </Attribute>
  <Attribute DocumentType="V5">
    <RefKeyName DataType="REAL" Units="INCH">Upper limit</RefKeyName>
    <CorrespondingAttribute DocumentType="JT">
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    </CorrespondingAttribute>
  </Attribute>
  <Attribute DocumentType="V5">
    <RefKeyName DataType="REAL" Units="INCH">Lower limit</RefKeyName>
    <CorrespondingAttribute DocumentType="JT">
      <KeyName DataType="REAL" Units="MM">lowerDelta</KeyName>
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  </Attribute>
</PMI>
```

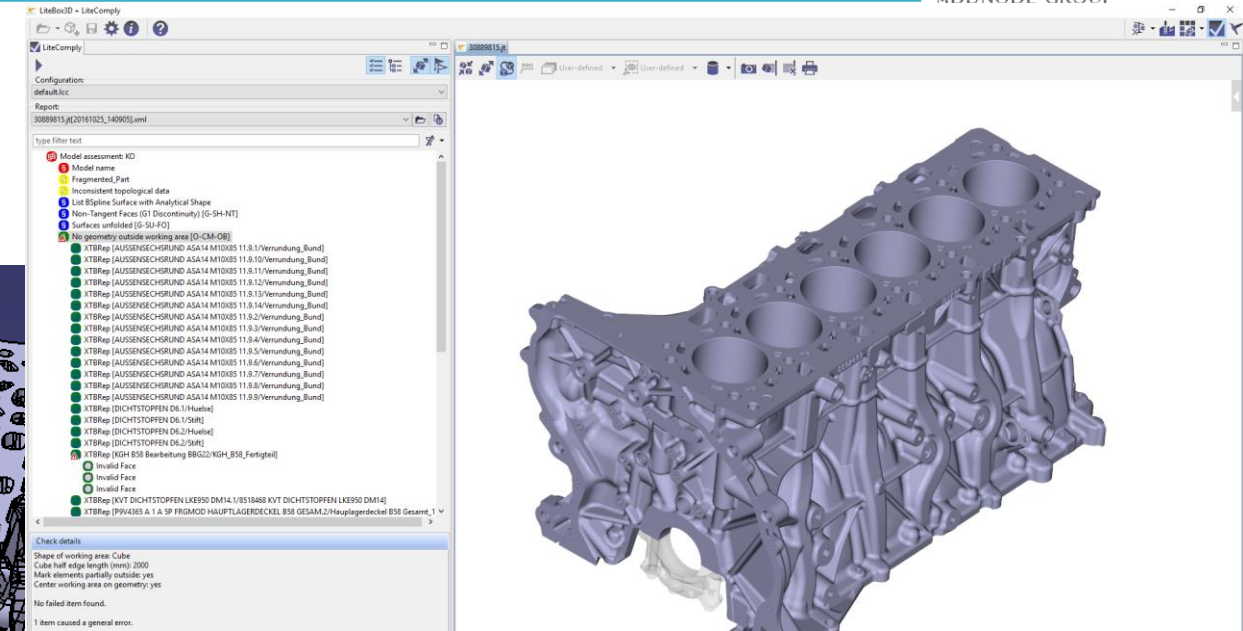
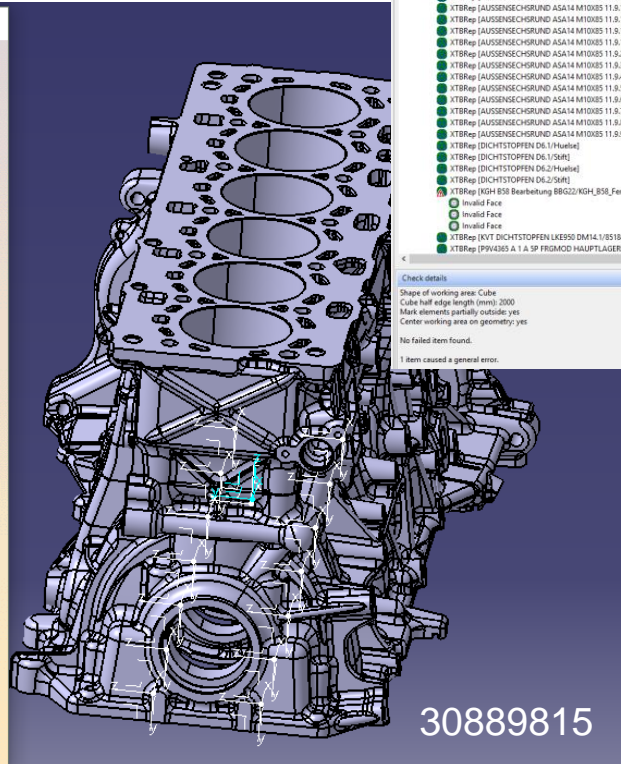
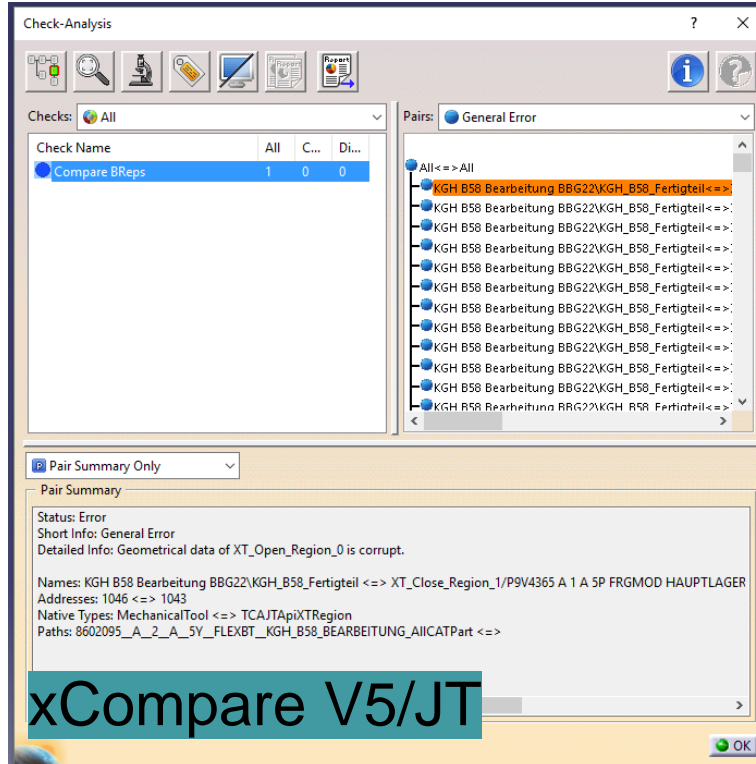
# Difference in BREP - Cavity lost during translation



# Difference in BREP – Geometry first visible after CATDUA



## Corrupted JT BREP

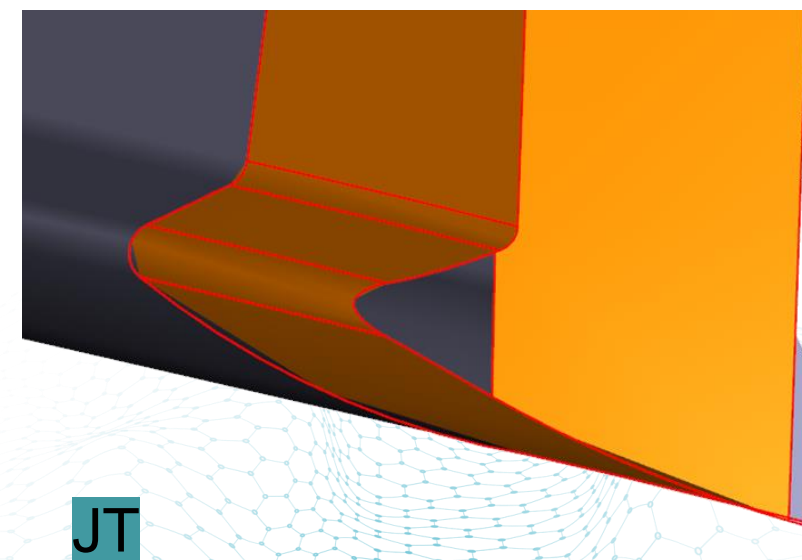
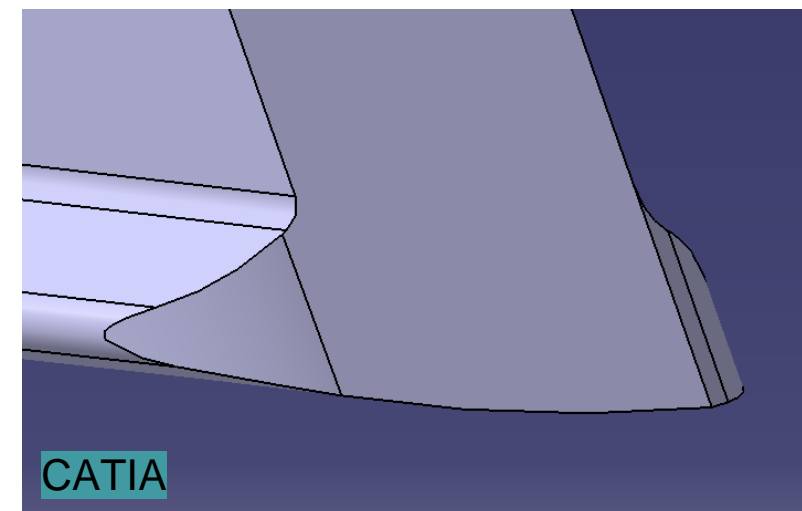
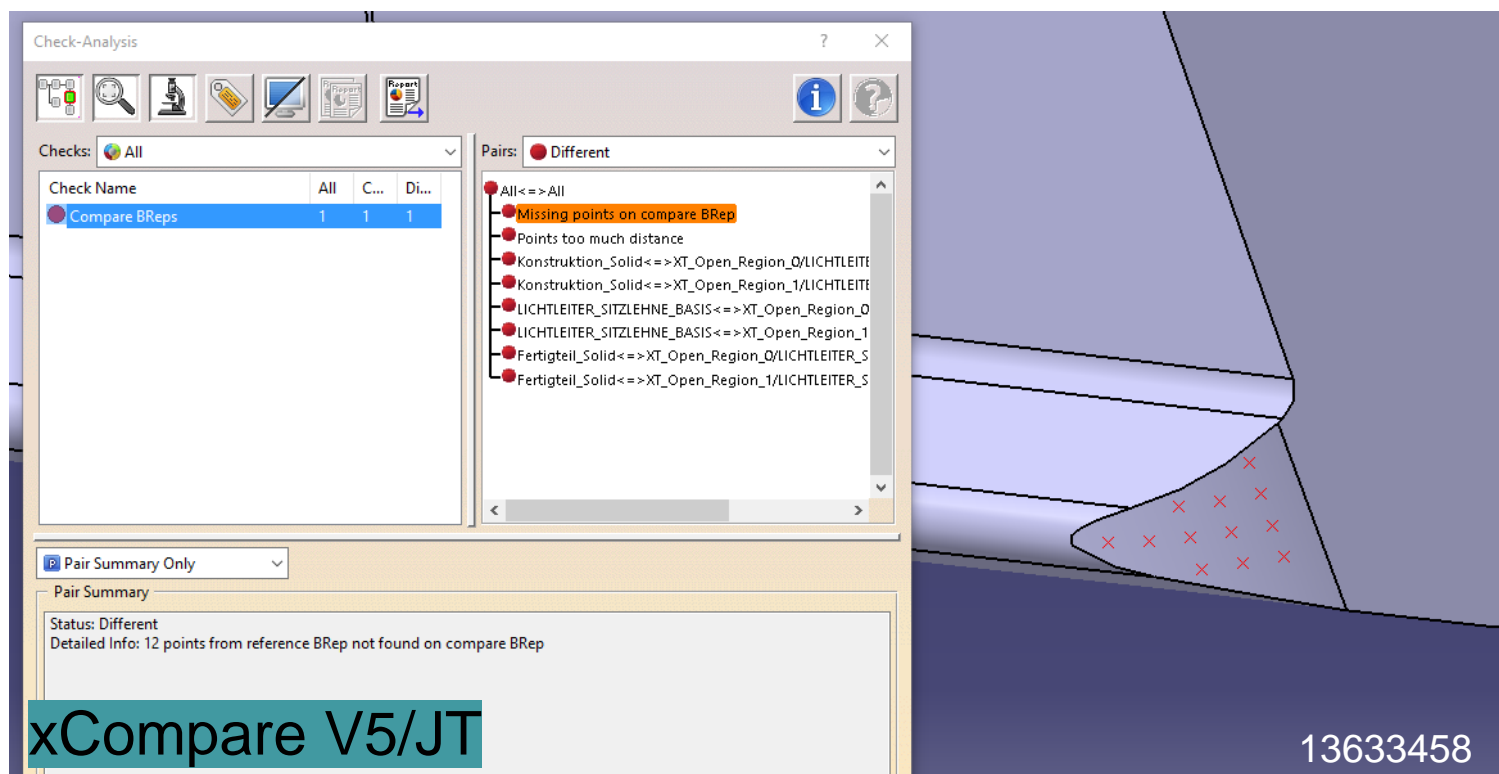


Verification of JT with LiteCompy showing different issues:

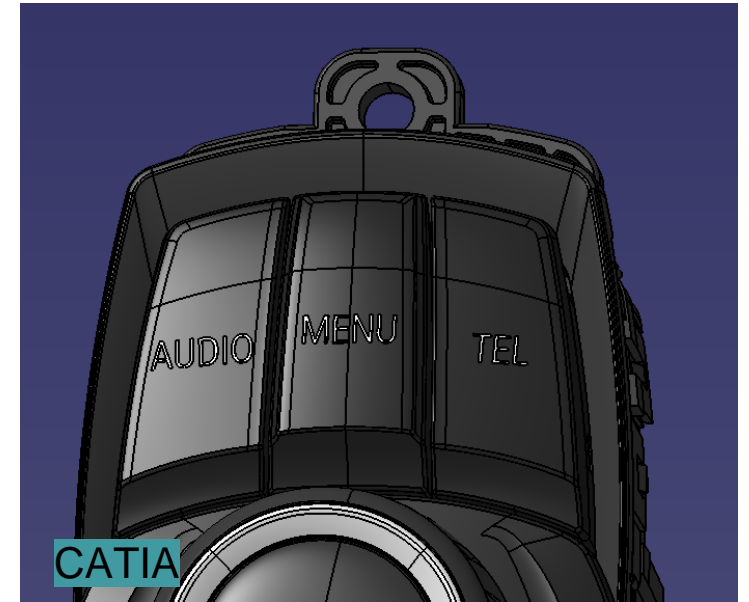
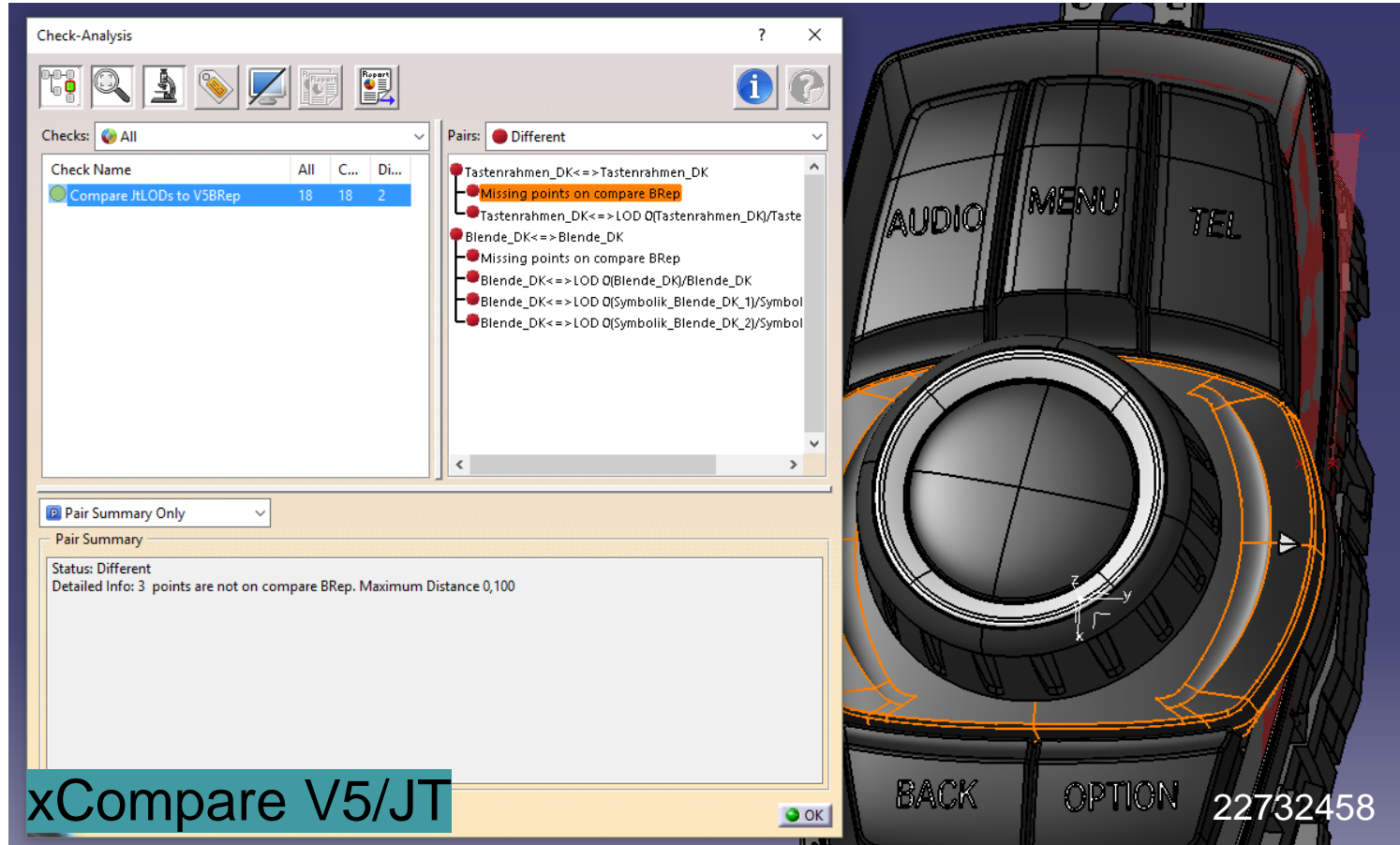
- Fragmented\_Part
  - Inconsistent topological data
  - List BSpline Surface with Analytical Shape
  - Non-Tangent Faces (G1 Discontinuity) [G-SH-NT]
  - Surfaces unfolded [G-SU-FO]
  - No geometry outside working area [O-CM-OB]
- XTBRep [KGH B58 Bearbeitung BBG22\KGH\_B58\_Fertigteil]
- Invalid Face
  - Invalid Face
  - Invalid Face
- Check details
- Invalid geometrical object cannot be used for computation.



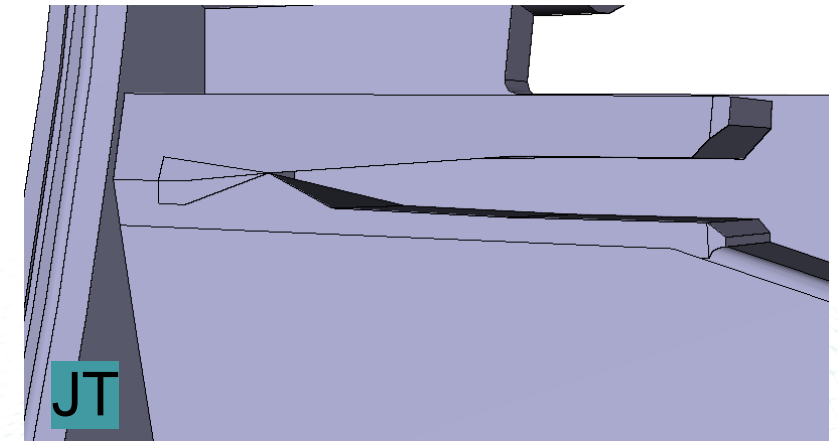
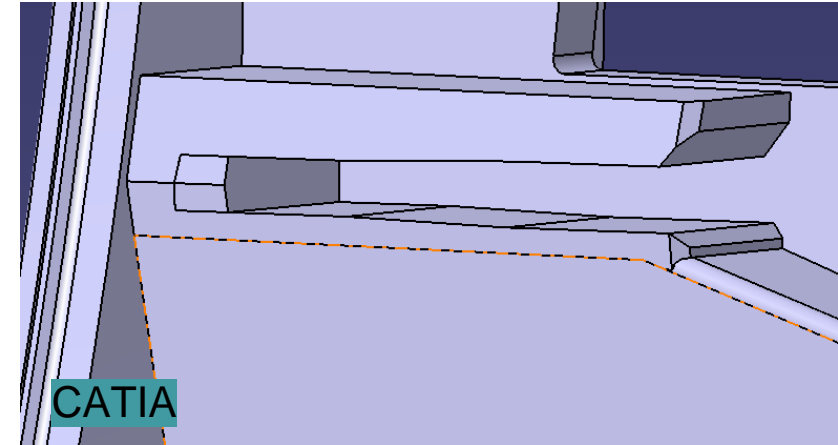
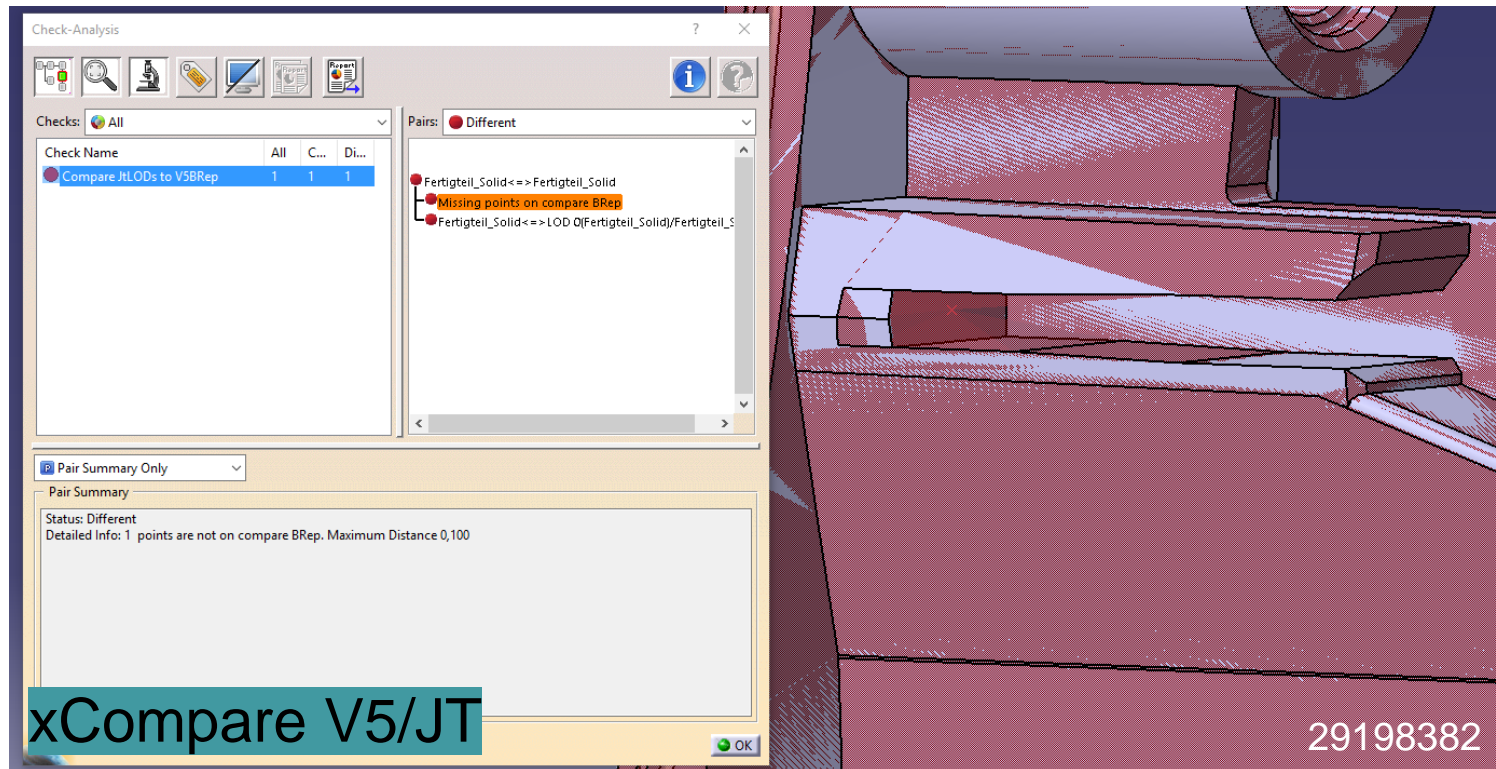
# Difference in BREP and Tesselation – Face missing in JT



# Wrong JT Tesselation

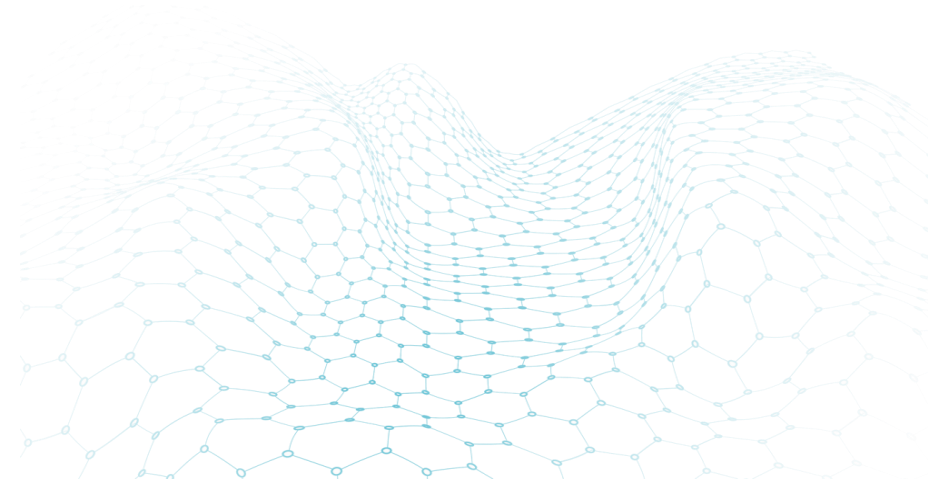


# Wrong JT Tesselation



## Saving time, Increasing reliability

- **Saving time with comparing models**
  - Instead of doing it manually xCompare provides easy validation inside of CATIA or in batch mode. Results are presented in a detailed report.
- **Increase reliability**
  - Manual inspection implies the risk of human errors – changes could be missed especially in complex models. xCompare ensures that ALL modifications are found.
- **Automatically created change report**





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# xCompare Use Cases

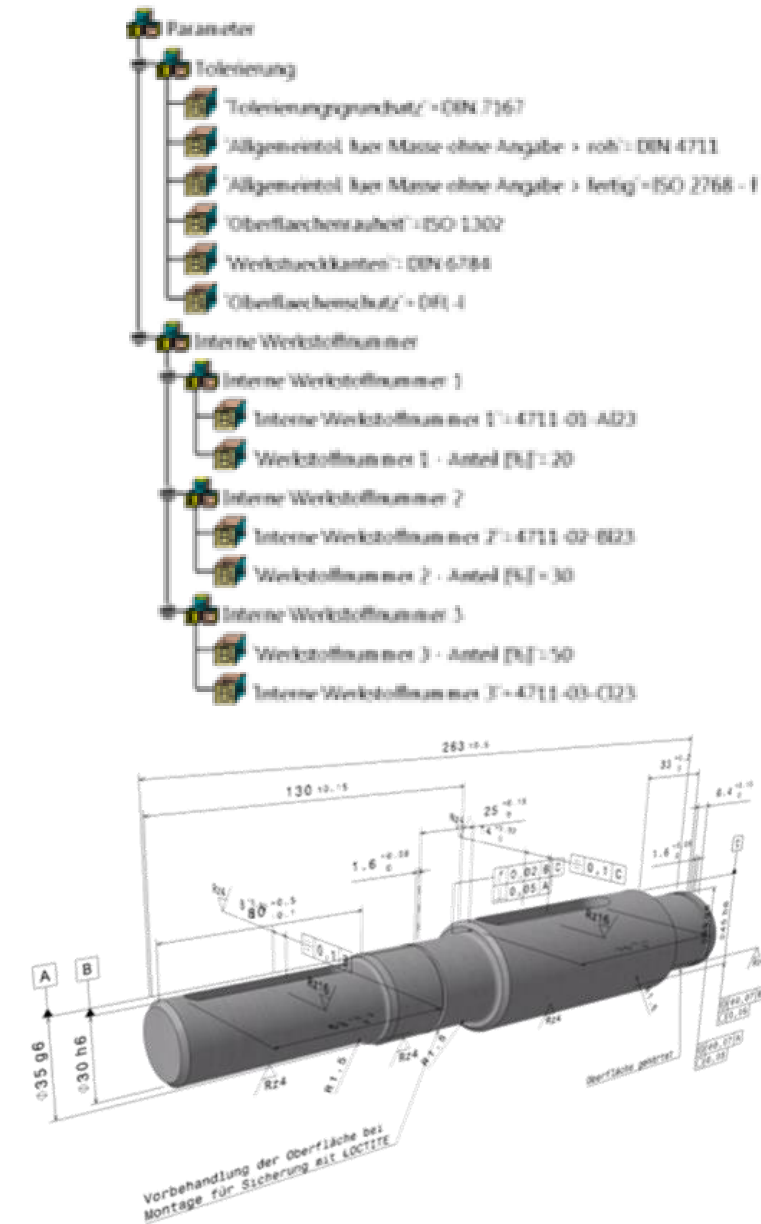
EXPERIENCE MATTERS



## 3D Master / MBD (Model-based definition)

## Story:

- By using the "Model Based Definition" method, all production-related information, such as geometry information, production and support details, and information about change management have to be stored in the 3D model.
- At model change is not only sufficient to know only about geometrical changes, but also changes in the additional information are important because they are essentially for the MBD process.
- xCompare identifies all differences in geometry and metadata (e.g. FT/A dimensions, annotations, tolerances, etc.) and presents the results right in CATIA.



## OEM → Supplier

### Story:

- The OEM is providing surrounding parts e.g. to an interior supplier. Based on this the supplier is starting with the interior design.
- Continuously new revisions of the surrounding components are provided to the supplier.
  - Task of the supplier is to identify changes between the current and new revision. Have components to be added, deleted or their position moved? How does this affect the interior design? Are the reference and position points still fitting?
- With xCompare, product and part comparison can be an automated part of this verification process.



OEM

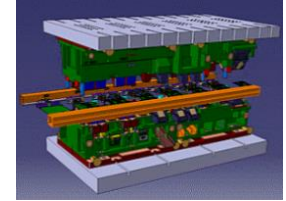


Supplier

## Design → Tooling / Simulation / ...

### Story:

- The design department is creating assemblies or single parts that are given to downstream processes for different purposes. E.g. an external company shall make tools or molds based on this design.
- Usually, the tooling company/department initially receives an early design state for bidding. Continuously new revisions of the design model are created and provided to the tooling company.
  - Task is to identify **shape changes** between the current and new revision of the design models to verify that they are acceptable with manufacturing requirements.
  - Update only identified changes in the manufacturing model instead of rebuilding it for each design revision.
- This process is similar with other downstream processes, like simulation, etc.
- xCompare quickly identifies and documents any kind of changes.



Design Changes



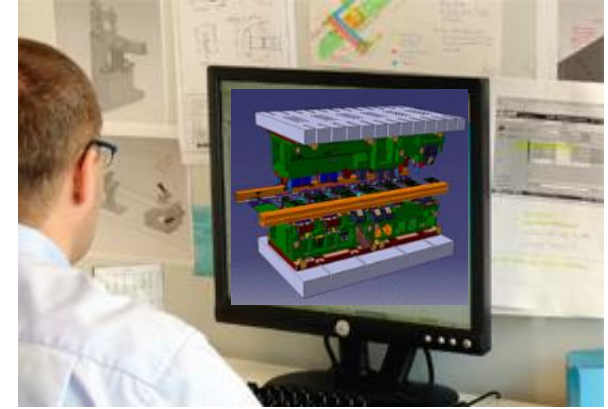
Manufacturing



## Tooling Design → Shop floor

Story:

- The Tooling Design is done in CATIA. Luckily, an existing tooling design can be used with a few adaptations.
- But how to inform the shop floor about these changes?
  - Mainly interesting is if components have been added, deleted or their position moved in the assembly. Castings might have to be modified.
  - Once the new tooling assembly is created, a comparison run with xCompare highlights the differences between the existing and new tooling assembly and its components. The results can either be stored in 3D or in detailed reports with screenshots and given to the shop floor.



Tooling Design

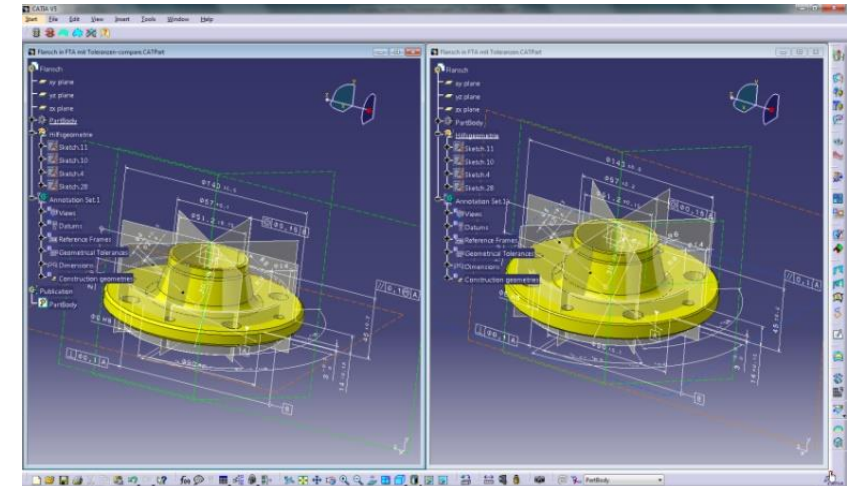
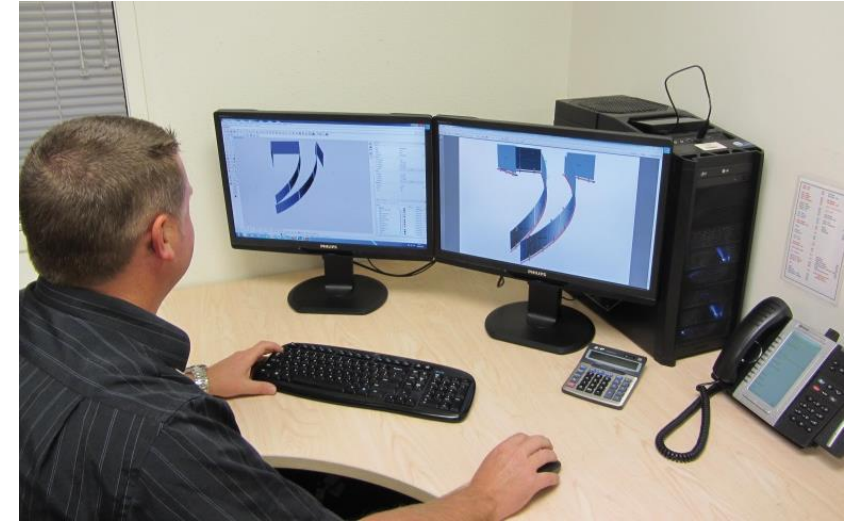


Shop Floor

## Redesign of parts

### Story:

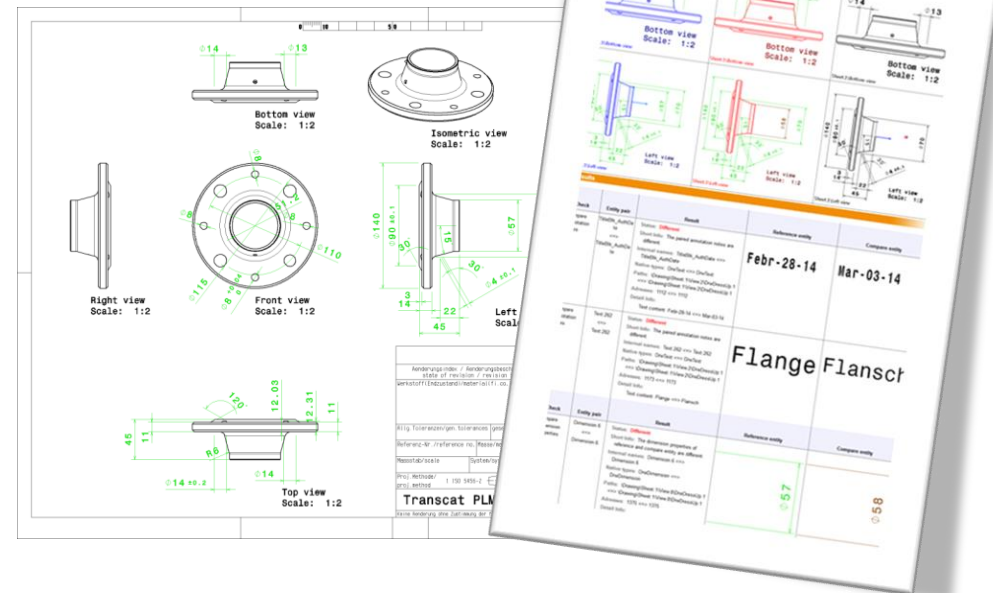
- Existing CAD models shall be redesigned against new design methods. Usually, this is done with parts that are regularly used within different designs and shall be highly parametric to quickly create variants.
  - It's very important to verify that the new – fully parametric – part has exactly the same shape of the original model.
- xCompare identifies and documents any changes between these two designs and determine if any unintentional changes have been introduced.



## Design approval

### Story:

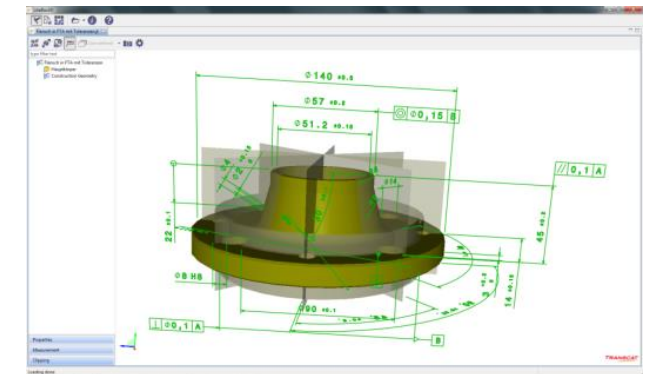
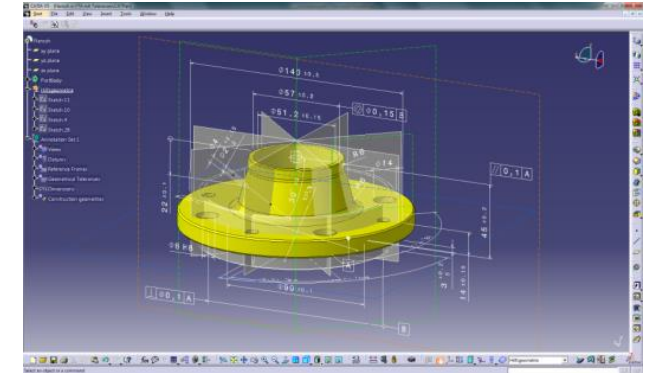
- For design approval often drawings are used. If a previous revision has been approved in past already, only the differences of the new revision need to be reviewed and approved.
- xCompare compares two drawing documents – interactively in CATIA or in batch mode and highlights the differences in CATIA or in a detailed report.
- So the approval process can be made much quicker.



# Data translation

## Story:

- Regularly, CAD data are translated into different CAD or neutral formats. Due to geometrical quality defects within the CAD model or translator issues, features could get lost or are being changed during the translation process.
- With xCompare unacceptable differences caused by translation can be avoided before the model is moved into downstream.
  - This is important when the result model is used in downstream processes like manufacturing or Long Term Archiving and it is expected that the original CAD model is identical with it.
  - xCompare supports the conversion process from CATIA V5 into JT or SMG (CATIA Composer).

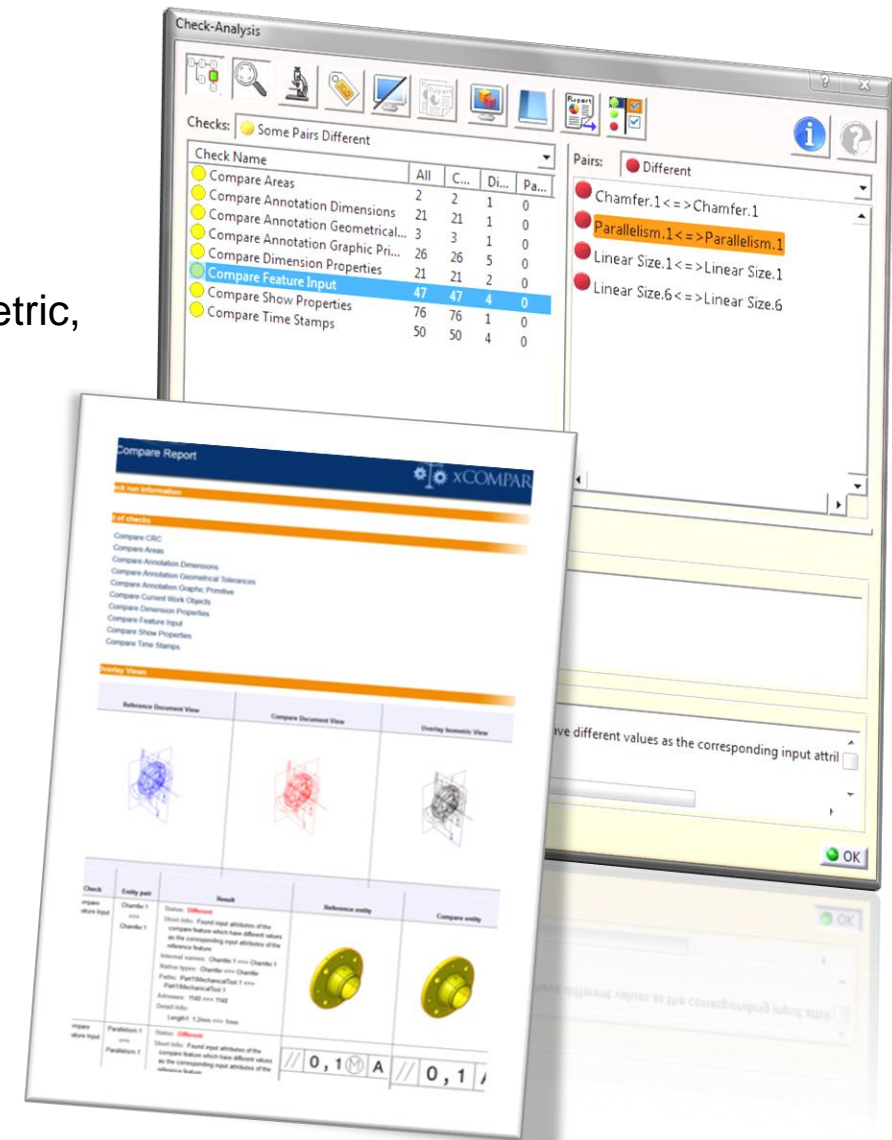




## Saving time, Increasing reliability

### Story:

- **Track ALL design and engineering changes**
  - For V5 Parts, Products, Drawings, Cgrs, JT and SMG
  - Feature-based comparison detects ALL design changes, including geometric, topologic and annotation (FT&A)
- **Fully integrated with CATIA V5 or LiteBox3D**
- **Interactive and Batch Comparison**
- **Detailed and flexible reporting**
  - Detailed xml report of all modifications with screen captures
  - Highly customizable through style sheets



## xCompare Sample Customers



HONDA



AISIN AW



RHEINMETALL  
AUTOMOTIVE



DRÄXLMAIER



SAFRAN



TOYODA GOSEI

NAMYANG NEXMO



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With over 30 years' experience, more than 6000 Customers worldwide and World-class knowledge in PLM & Intelligent Engineering, we work together as an extension of your team to create an exceptional PLM experience.

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