Automated Teamcenter CAD Validation

GLOBAL PRODUCT DATA INTEROPERABILITY SUMMIT 2016

ELYSIUM Parker Aerospace NORTHROP GRUMMAN BOEING

Brian Walker
Honeywell Aerospace

Annalise Suzuki
Elysium Inc

Brian Walker

Work Experience
Honeywell Aerospace
- MBE Tools & Process Development Lead
- PLM Strategy & Governance
- Previously in mechanical design (valves, engine installations, and APUs)

Mechanical design experience in automotive & aerospace industries prior to Honeywell.

Education
- B.S. Mechanical Engineering – Michigan Tech
- M.E. Systems Engineering – Penn State

Annalise Suzuki

Work Experience
Elysium Inc
- Director, Americas Sales and Engagements
- Product Management
- Responsible to ensure Americas team understands and delivers customer requirements for success; Allocate appropriate resources to projects and drive product development. Influence global company strategy.

Industry Involvement
- AIAG MBE Workgroup Volunteer
- JT Open TRB Member
- CAx-IF / ProSTEP / PDES Inc. / LoTAR

- **Elysium**
  - Annalise Suzuki, Director, Americas Sales and Engagements
  - Masayuki Yonezawa, ASFALIS Technical Application Engineer

- **Honeywell Aerospace**
  - Cristina Martinez, MBE Tools & Process Development Lead
  - Marco Vaquera , Data Exchange Solution Architect
  - Ravikiran Choudhari , Development Lead

Honeywell Aerospace Overview

FACTS

- Headquartered in Phoenix, Arizona
- ~38,000 employees worldwide
- ~100 worldwide manufacturing and service sites
- Annual revenue of ~$12 billion

STRENGTHS

- Global leader in aviation industry
- Driving modernization of global air traffic management (ATM)
- Developing innovative safety products
- Committed to improving operational efficiencies

Honeywell's Business

Automation & Control Solutions
Minneapolis, MN headquarters

$14.1B

Aerospace
Phoenix, AZ and Rolle, Switzerland headquarters

$15.2B

$9.2B

Performance Materials & Technologies
Morris Plains, NJ headquarters

- **$38.6B in sales**
- **Approximately 129,000 employees, 1,300 sites, 70 countries**
- **Morris Plains, NJ global corporate headquarters**

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Elysium Overview

- **Founded: 1984**
- **Employees: 95 (56 Development)**
- **3D Data Expertise:**
  - **Translation**
  - **Geometry Healing**
  - **Quality Management**
  - **Validation**
  - **Simplification**
  - **Reverse Engineering / Point Cloud Rendering**
- **Off-the-Shelf, OEM, & Migration Services**

aras corp   AUTODESK.   DASSAULT SYSTEMES   PTC   SIEMENS

Advanced Technologies for the Model-Based Enterprise

Global Product Data Interoperability Summit | **2016**

Check and heal quality

Translate

Recognize   Remove

Simplify: de-feature and envelope
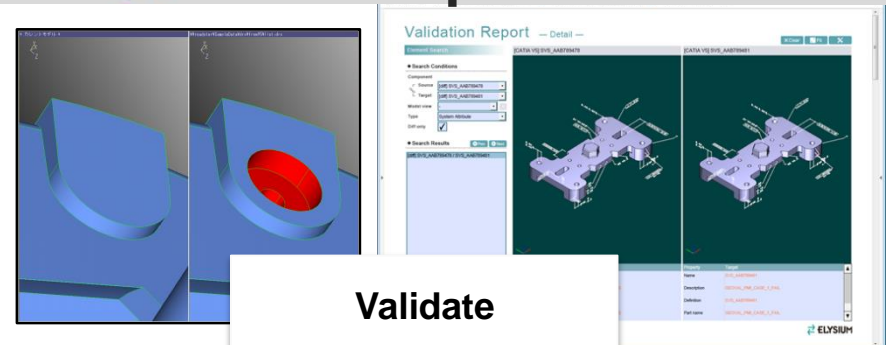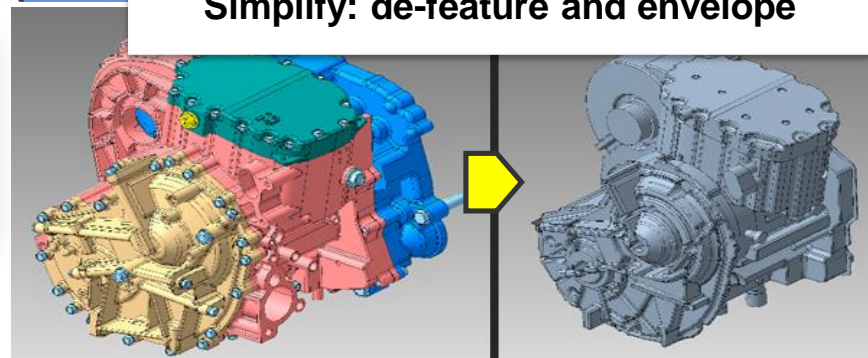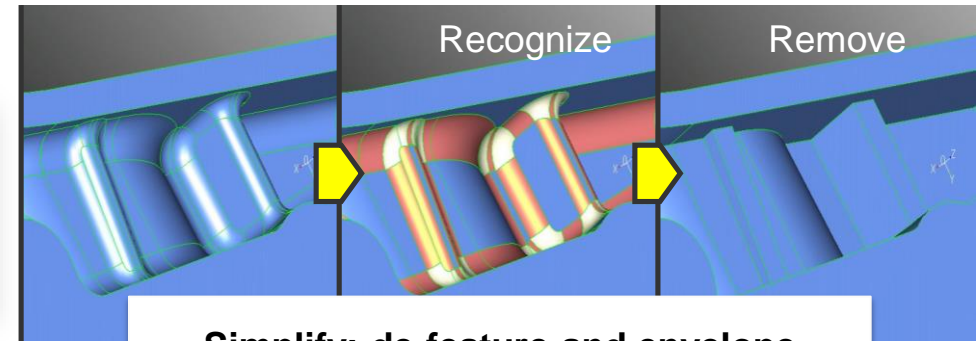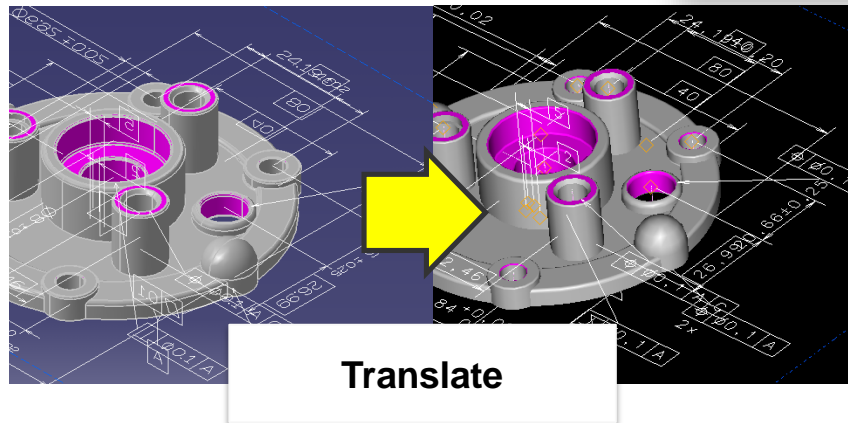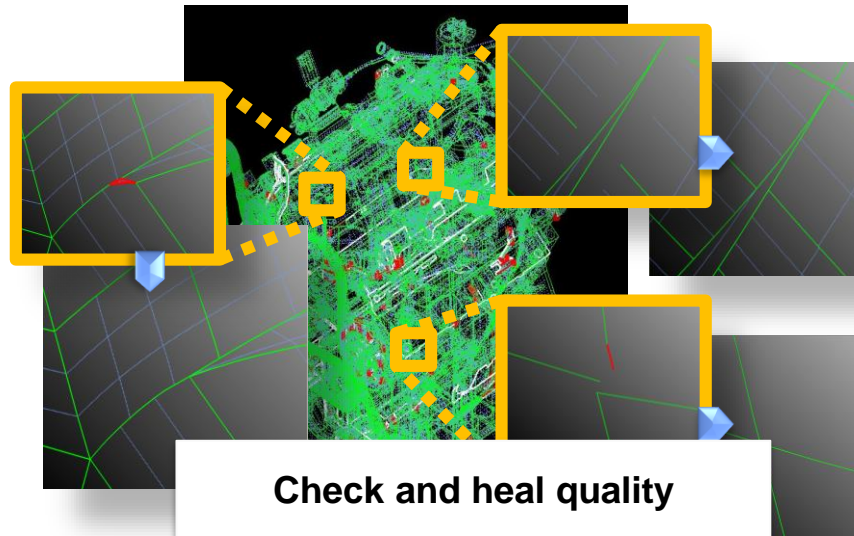
Validate

Current State

Honeywell has the need to translate CAD data for multiple interoperability and compliance reasons. A quality measure is then necessary to asses the data, but …

- Manual validation is cumbersome

- Validation results are inconsistent

- There is no established criteria to measure validation integrity

Automated Validation Critical Requirements (High Level)

1. Apply standardized validation criteria

2. Validation report must be user friendly

3. Existing Export control measures must not be bypassed

How do we get there?

This track will provide an overview of the solution as well as the formed partnership between Honeywell and Elysium implementing ASFALIS within Team Center.

Requirements

The following validation scenarios must be addressed:

- **Design revision documentation**
    - To document unknown changes between different revisions of the same ITEM

- **Translation validation**
    - A master-derivative validation process

- **Validation of step files for downstream process consumption**
    - Provide validated STEP format CAD data to other processes that might need to consume datasets

- **Product Data Quality (PDQ) Verification compare**
    - CAD Verification on demand

About the solution
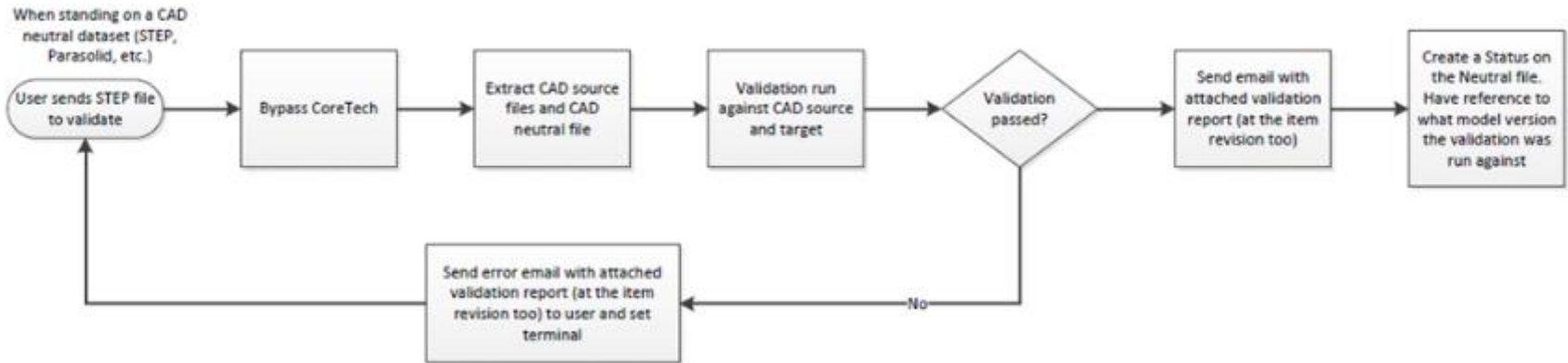
Use case	Service Name	description
Use case 1	**honREVval**	Unknown changes between revisions
Use case 3	**honDERval**	Master-derived compare (from same revision)
Use case 4	**honSTPval**	Master-derivative compare when target is STEP
Use case 5	**honPDQval**	PDQ assessment and compare

Project Schedule
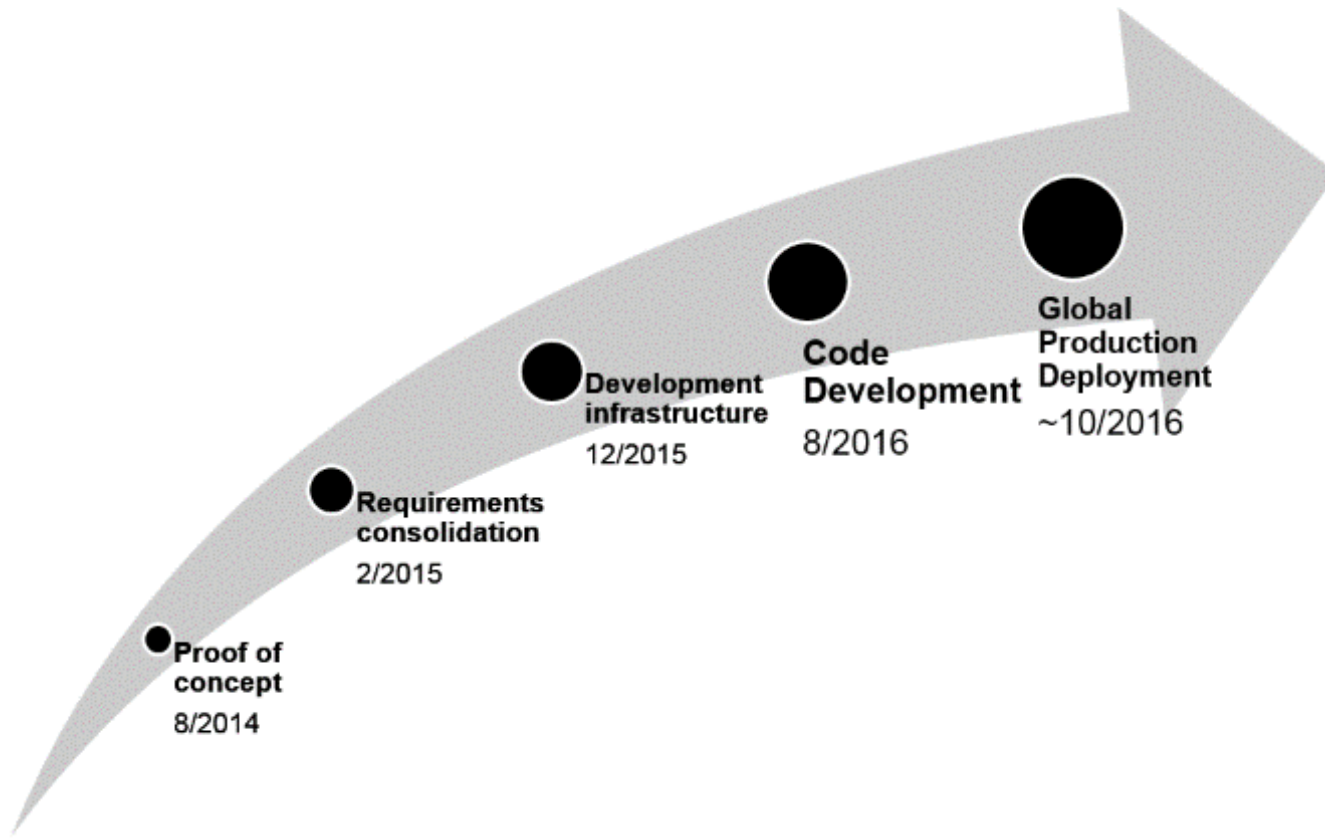
- Proof of concept
  8/2014
- Requirements consolidation
  2/2015
- Development infrastructure
  12/2015
- Code Development
  8/2016
- Global Production Deployment
  ~10/2016

1) Select Master dataset
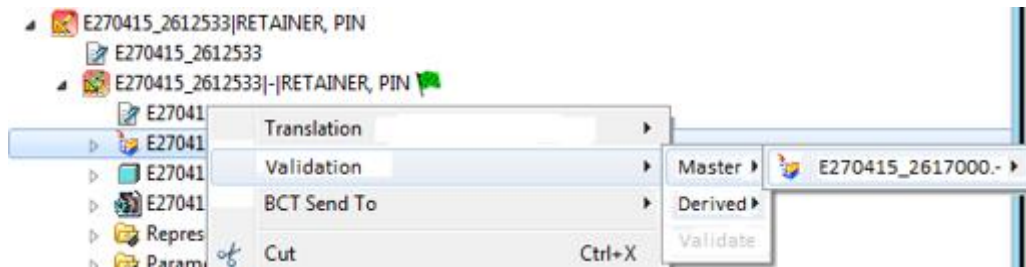
2) Select Derived dataset

3) Validate

4) Confirm Validation pair

5) Email Notification for end user

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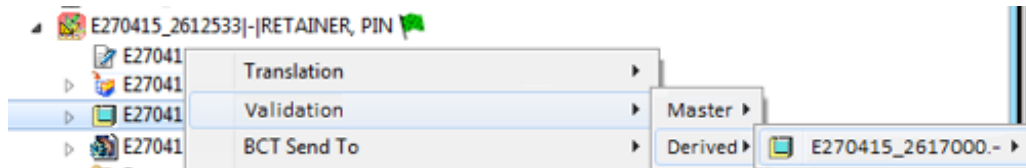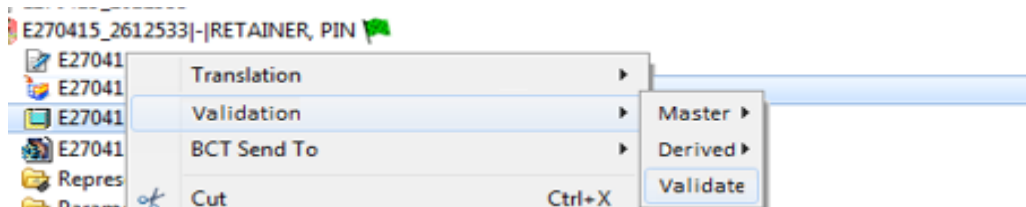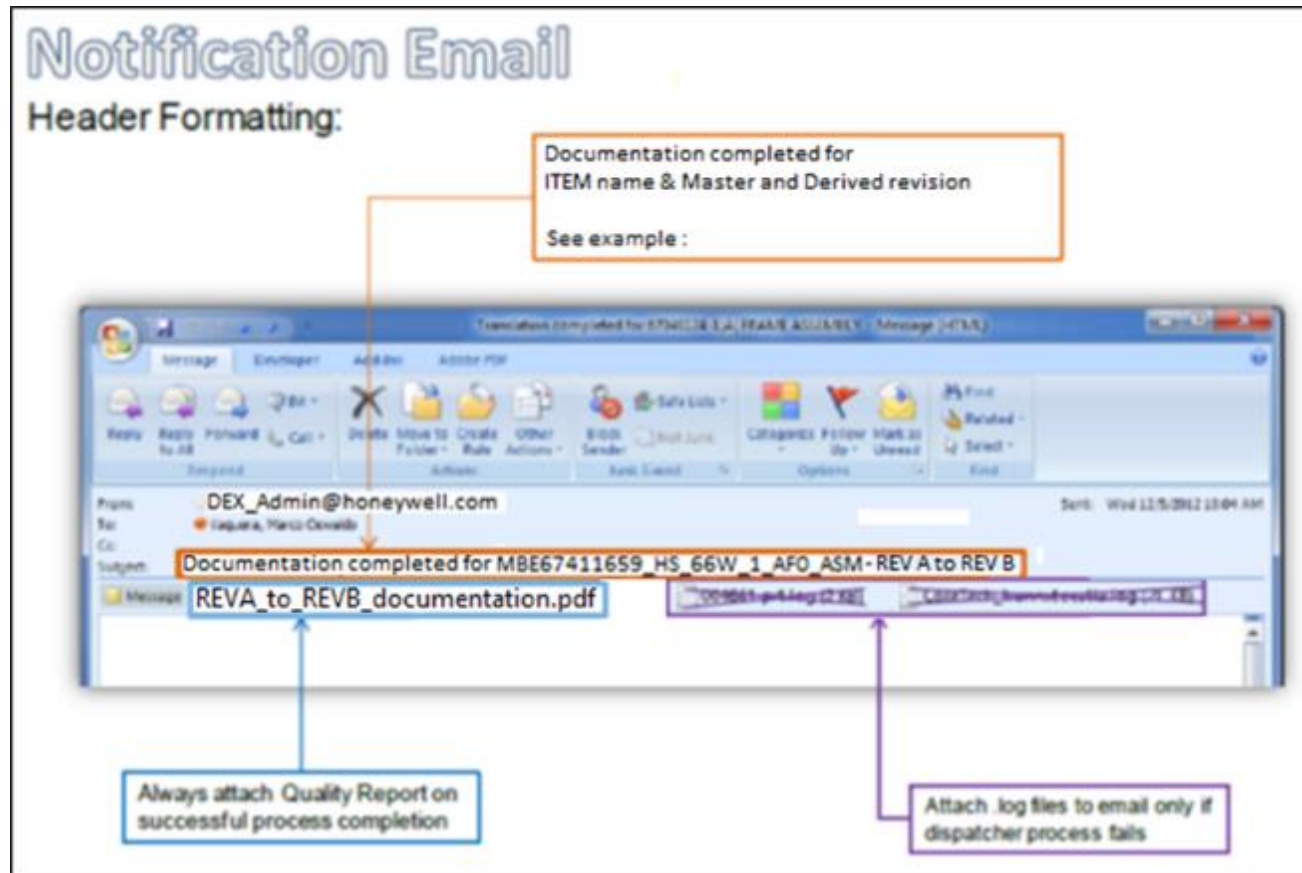
Storyboard – Validation Report

6) 3D PDF Validation Report

Validation Reporting & Viewing

3DPDF

DiffViewer

HTML

XML

- **Viewability / presentation options**
  - Model views, type of variance, ALL

- **Check criteria and reporting**
  - On/Off
  - Tolerance
  - Color map
  - Max deviation

- **Demos:**
  - HTML, 3DPDF

- **User acceptance – Getting users to think past their specific role**
  - Hard to define requirements when different stakeholders don't understand the big picture

- **Aligning with the business needs**
  - Deliver the right data, rapidly and easily at the right context at the right time!

- **Enhance end user experience**
  - Easy and standardized way to communicate validation issues
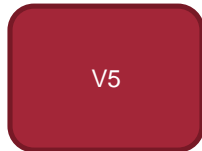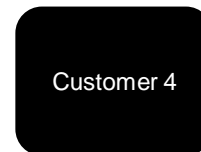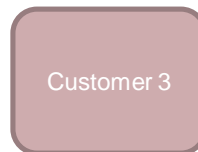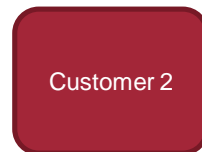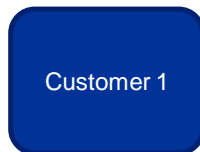 - Development of public space to share CAD validation best practices

Elysium offers 78 total PDQ check items! Options to filter:

- **Based on CAD system**

  V5   NX

- **Based on internal rules**
  - **Run large sampling, especially problematic cases**
- **Based on OEM criteria/ Standard/ Other**

  Customer 1   Customer 2   Customer 3   Customer 4

Methodology for Verification

- **Leverage CAD system modeling tolerance and kernel rules**
  - Different PDQ criteria makes sense for each CAD format:
    - NX, CATIA V4, CATIA V5, Creo, STEP, SolidWorks

- **Further enhance according to downstream use**
  - LoTAR
  - Toolpath generation
  - Inspection
  - FEA
  - Visualization
    - Iterative process and requires cooperation from end consumers to provide feedback

For additional information, please contact:

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