Automating Early Supplier Collaboration

Sagar Kumar

Honeywell Aerospace

Presenter Background

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Work Experience

Honeywell Aerospace

- Manufacturing Tool & Process Development Lead
- PLM Strategy and Governance

Education

- **B.S.** Industrial Engineering – Purdue University
  - West Lafayette, IN
- **MBA** – Arizona State University
  - Tempe, AZ

Honeywell Overview

$40.3B
in sales for 2014

55%
of sales outside U.S.

- **~1,250** sites, **70** countries
- More than **127,000** employees
- **Morristown, N.J.** headquarters
- **Fortune 100**
- **NYSE: HON**

Honeywell Overview

Aerospace

$15.6 Billion

Automation and Control Solutions

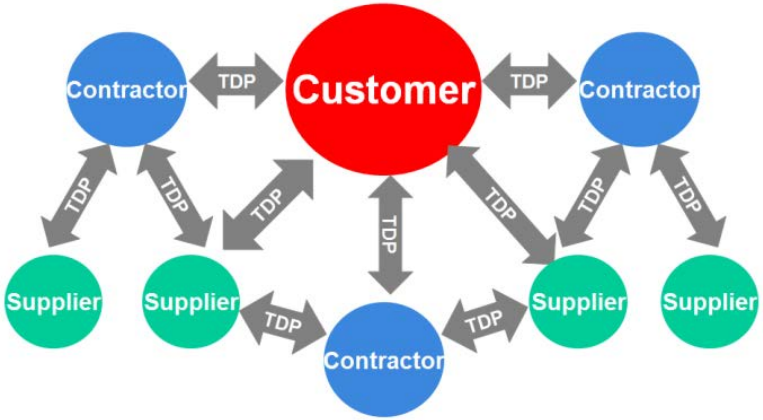
$14.5 Billion

Performance Materials and Technologies

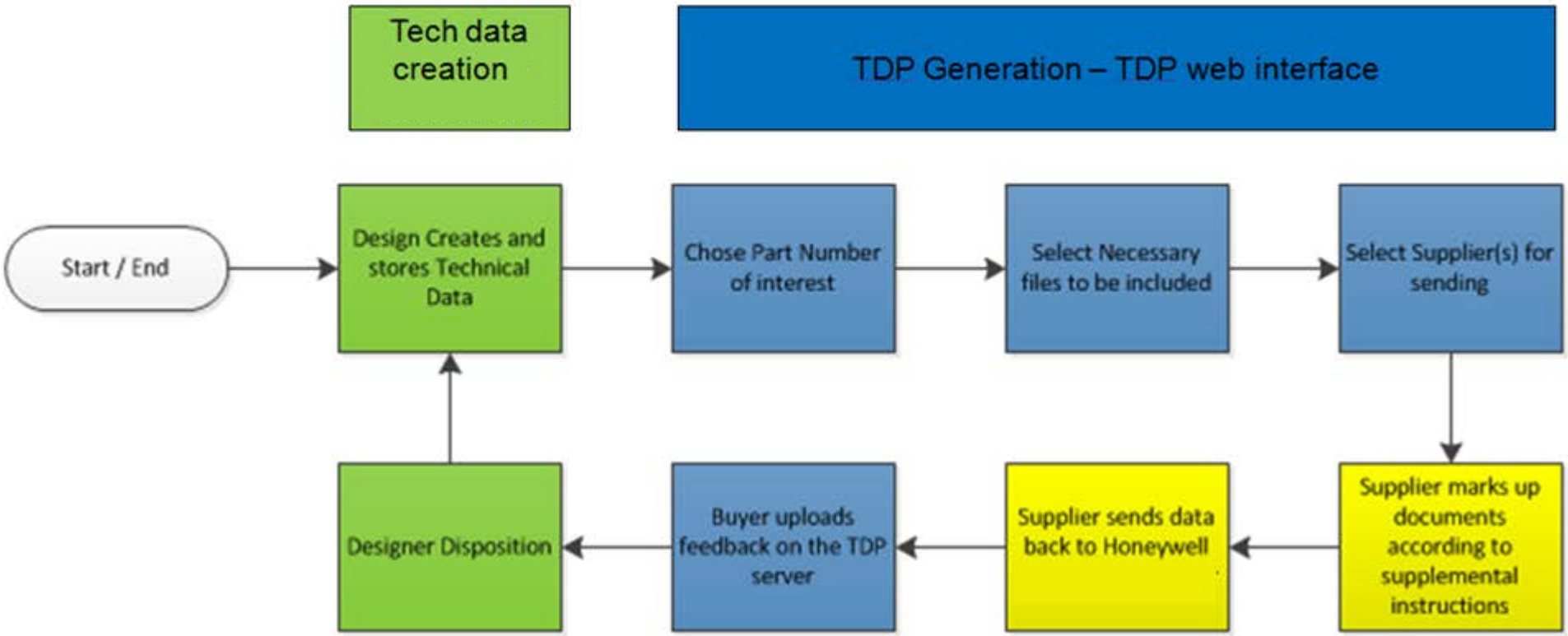
$10.2 Billion

Current State

- **There is no formal process for supplier collaboration**
- **Sporadic communication / information flow**
  - **Excess email correspondence and excess file transfer**
  - **NVA in supply chain verifying artifact versions and versions**
- **High cycle time**
  - **Time intensive / manual process (error prone)**
- **Not real time**
- **Supplier feedback disconnected from the design**



Design – Supplier Feedback loop (High Level)



Requirements

- **Linkage to design systems; both for released data, and unreleased data**
- **Linkage to secure Data Exchange mechanism**
- **Interoperability between different systems**
- **Export compliance**
- **Comply with MIL STD 31000A, STEP AP239e2, and emerging standards**
- **Exploiting existing SOAs**
- **Modifications of existing SOAs**
- **Build PLM – SOA translator**

Requirements

- **One-stop shopping solution**
- **User friendly**
- **Web based tool working on all platforms**
- **Agile development for shifting / arising requirements**
- **Flexibility of process to accommodate new business use cases while maintaining schema**
- **Queuing mechanism**
- **Metric solution – understand what feedback was returned and what was instituted**
- **Align with Program dates**

Approach – Three prong approach

- **Customer Facing Role**
  - **Meets with the business and the supplier to relay communication and requirements / use cases**
- **Software Design Modeling (UML / SysML)**
  - **Logical representation of what the system will do**
- **Development**
  - **Takes modeling language into the logic**

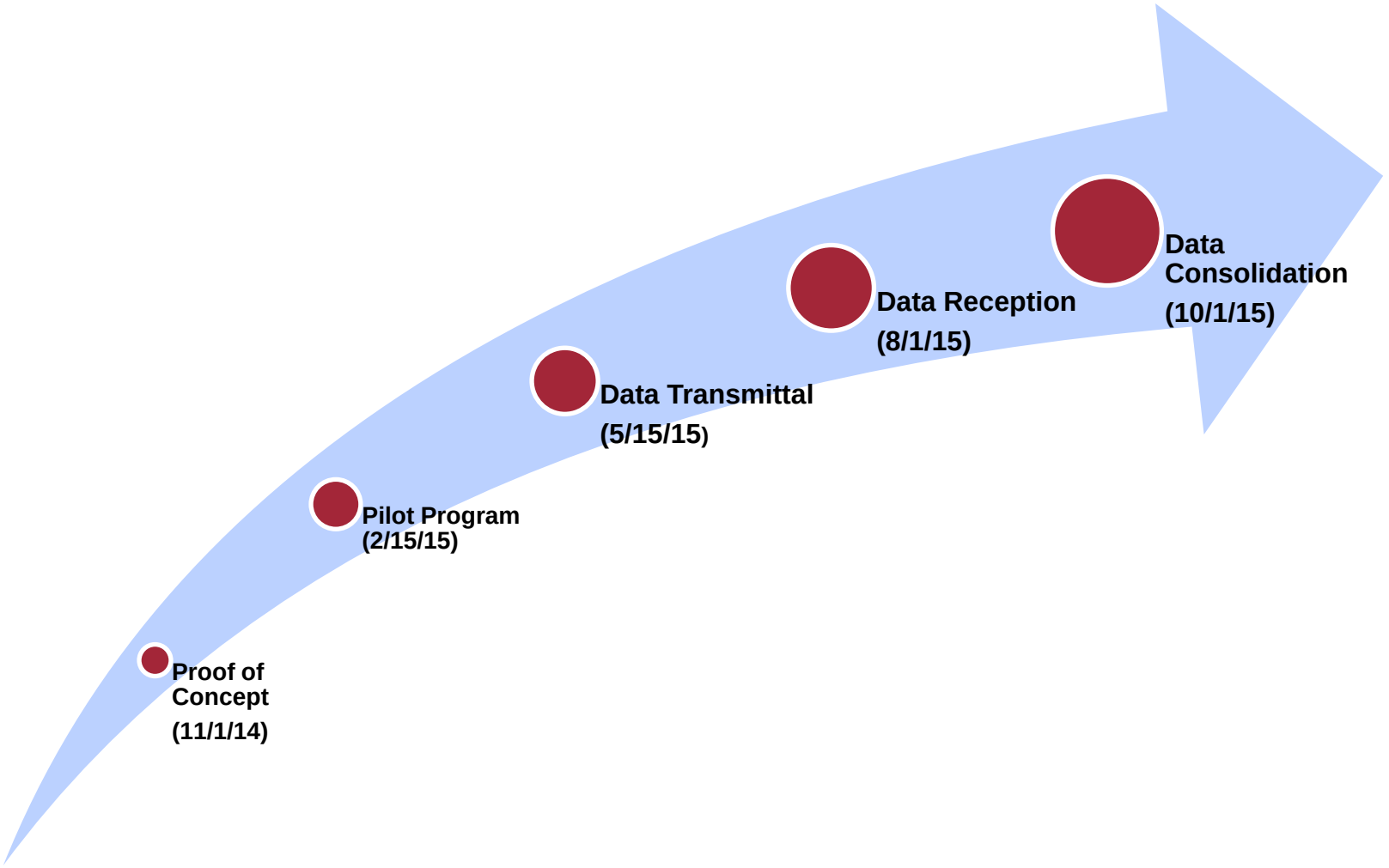
Management Operating System

- **Three different environments**
  - **Development, QA, Production**
- **Leveraging best practices**
- **Change Management**
  - **Communication to all leads**
  - **Rigorous end user training**
- **User acceptance testing (UAT)**
  - **SME personas**
  - **Feedback from key suppliers with test articles**

Management Operating System

- **Daily recurring meetings**
  - **Internal / External meeting**
- **Activity-based management**
- **Split the project into three phases to align to program requirements / schedule**
  - **Data Transmission, Data Reception, and Data Consolidation**

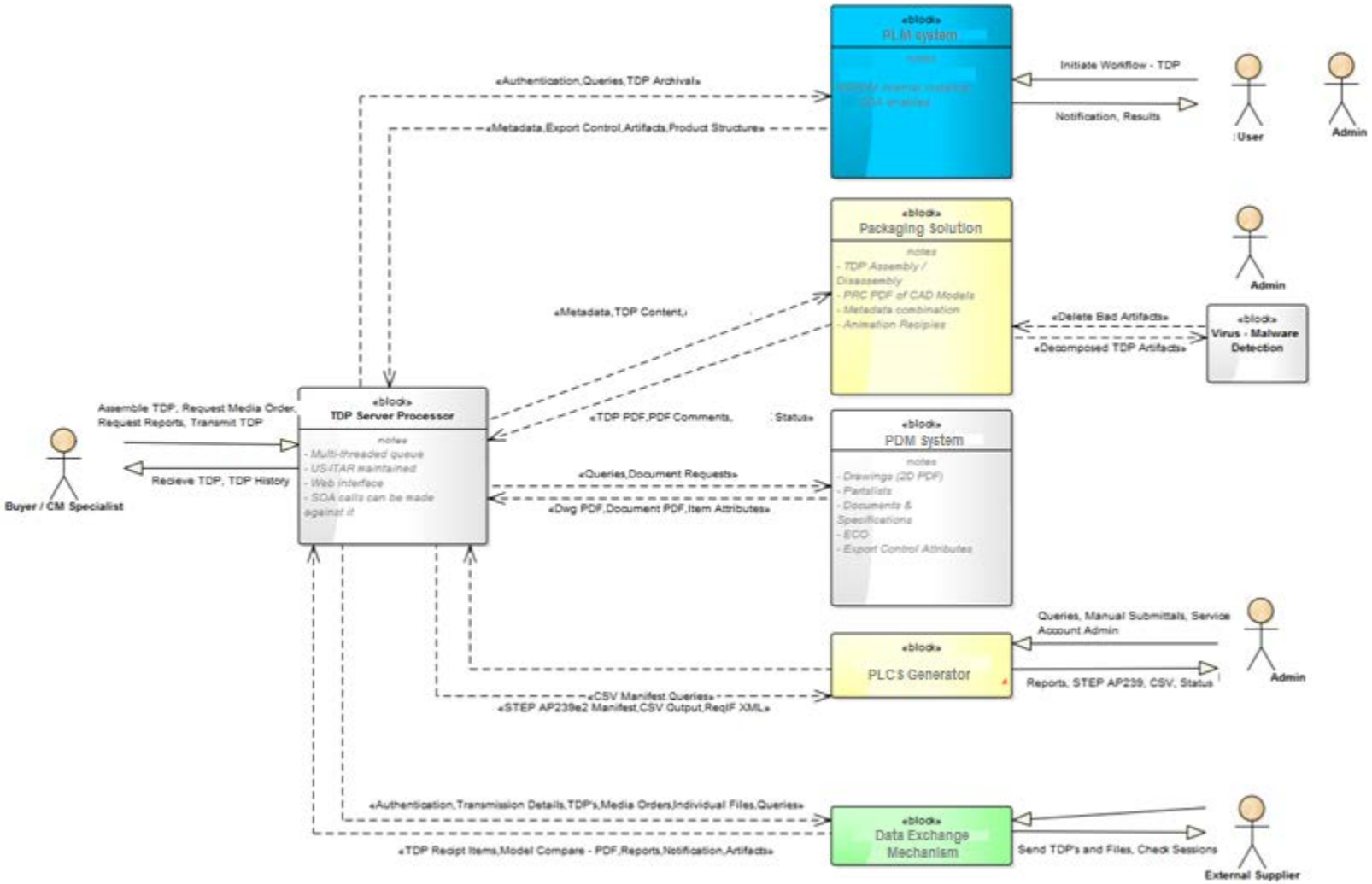
Project Schedule



Solution – Based on an SOA architecture

- **Based on Service Oriented Architecture (SOA)**
  - **Uses Representational State Transfer (REST)**
    - **Honeywell built SOA that interacts with PLM APIs**
  - **Uses Web Services Description Language (WSDL)**
    - **Data exchange**
    - **Data Packaging**
    - **Manifest generation**
    - **PDM**

Solution – Based on an SOA architecture

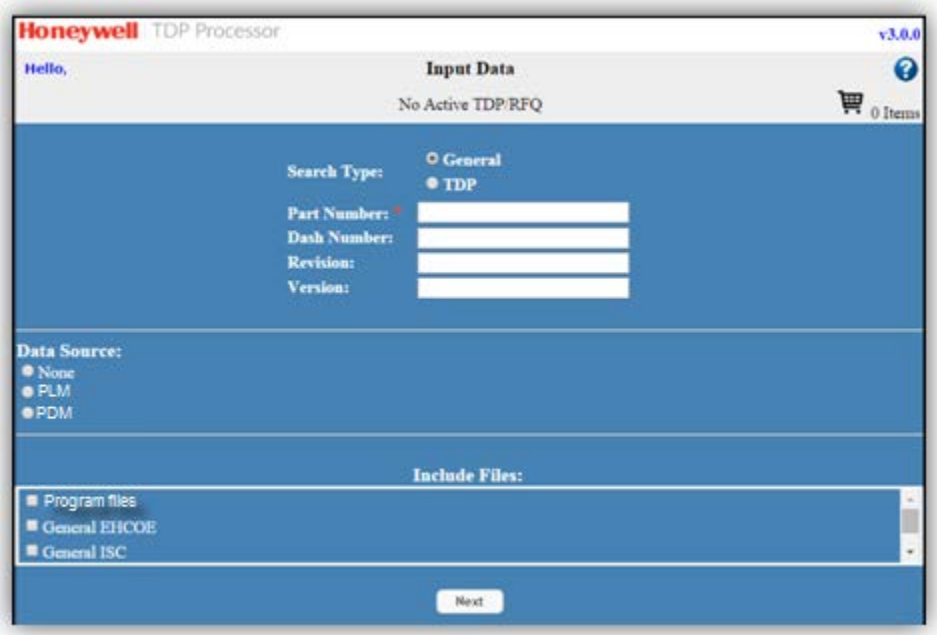


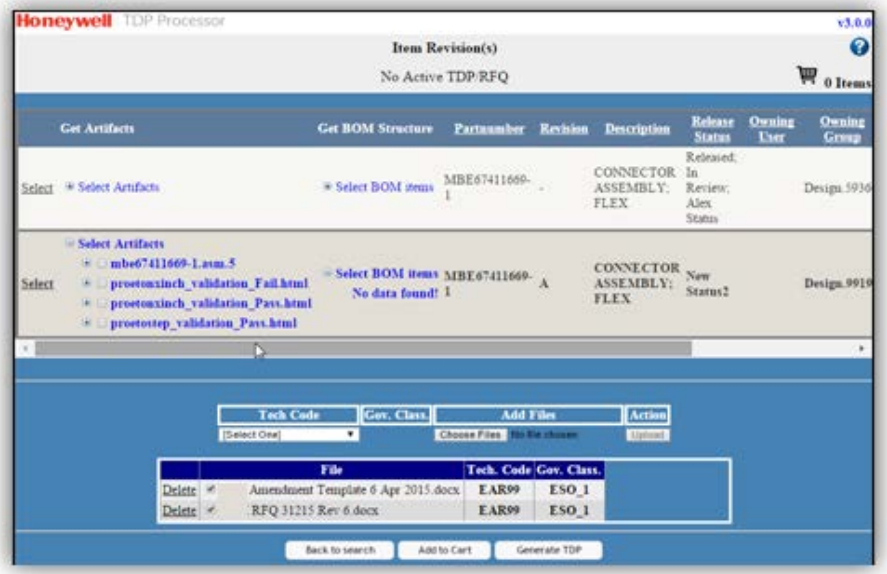
Solution – Based on an SOA architecture

- **Enables interoperability between systems for data sourcing and data management**
- **Simplistic user experience**
  - **Keeps designer in their tool, maximizing effectively**
  - **Simple solution for the buying group that will not typically understand design systems**
  - **Groups do not need to copy and track artifacts on different repositories – easier to enforce process**
- **A scalable solution able to support more data sources and different programs.**
- **Real time information, no back and forth**
  - **Includes mechanisms to verify data in source systems**

Storyboard – Login & Search

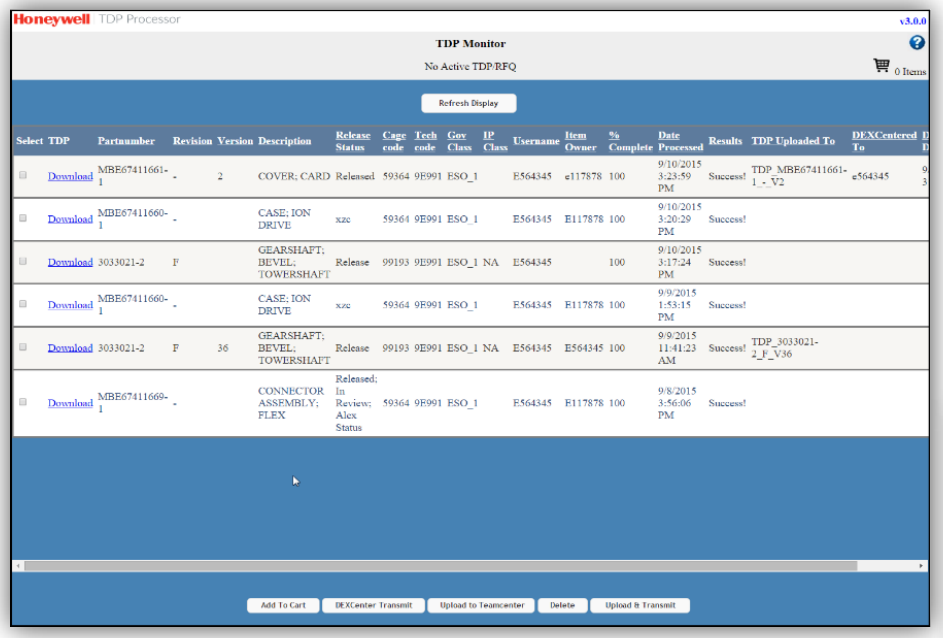
Global Product Data Interoperability Summit | **2015**



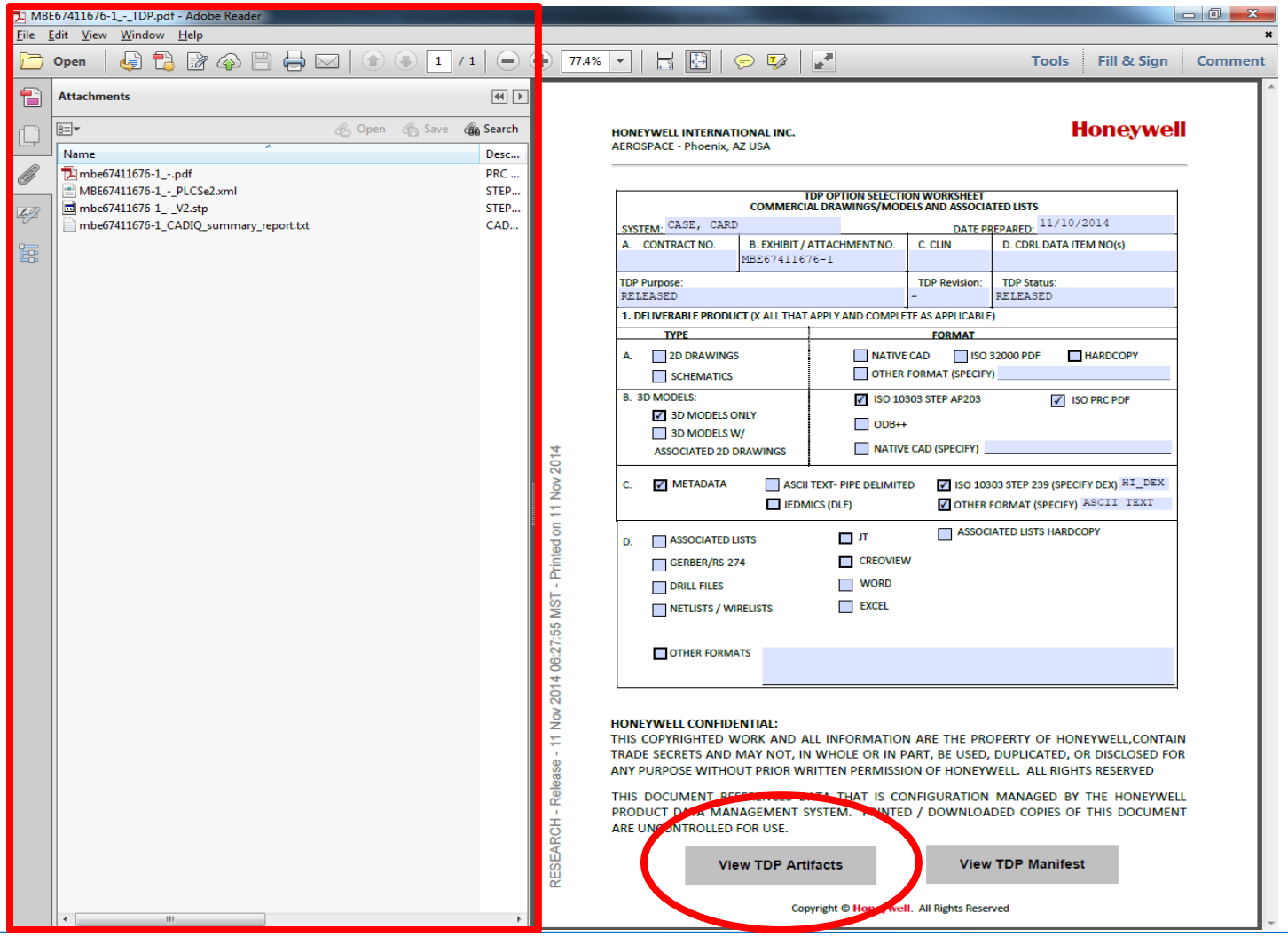


Storyboard – TDP Results & Transmittal

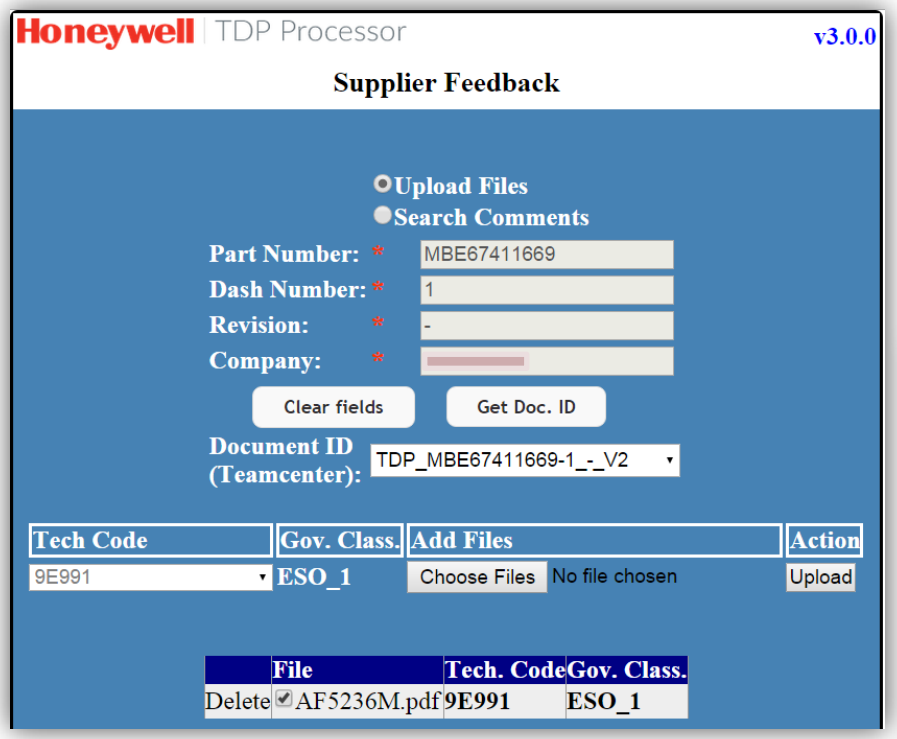
Global Product Data Interoperability Summit | **2015**

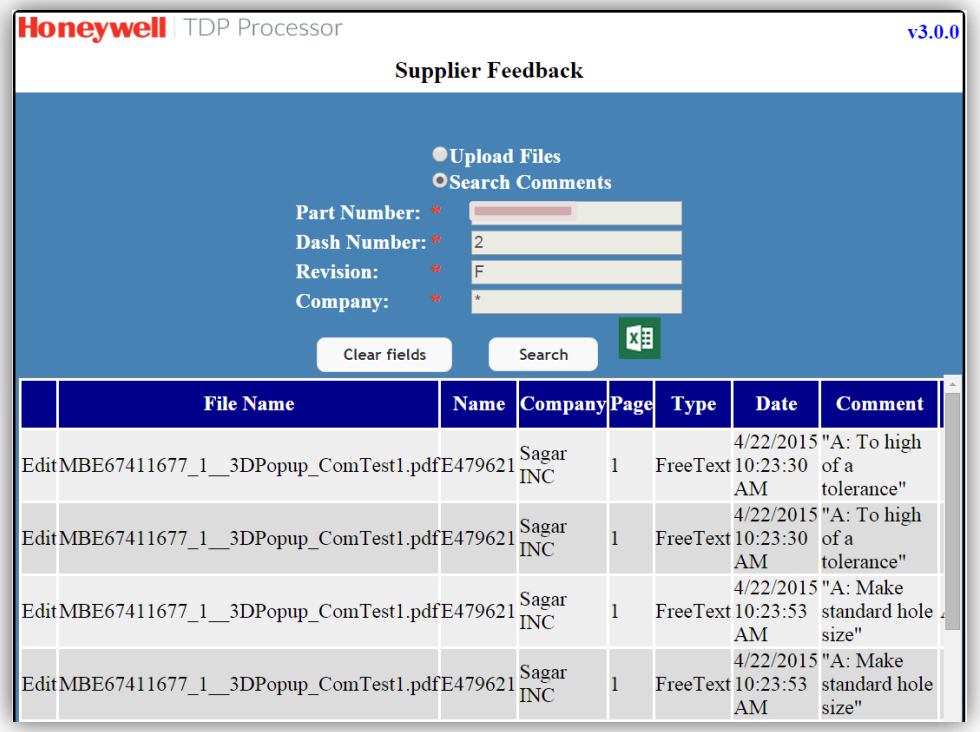


Technical Data Package – Look and feel (Demo)

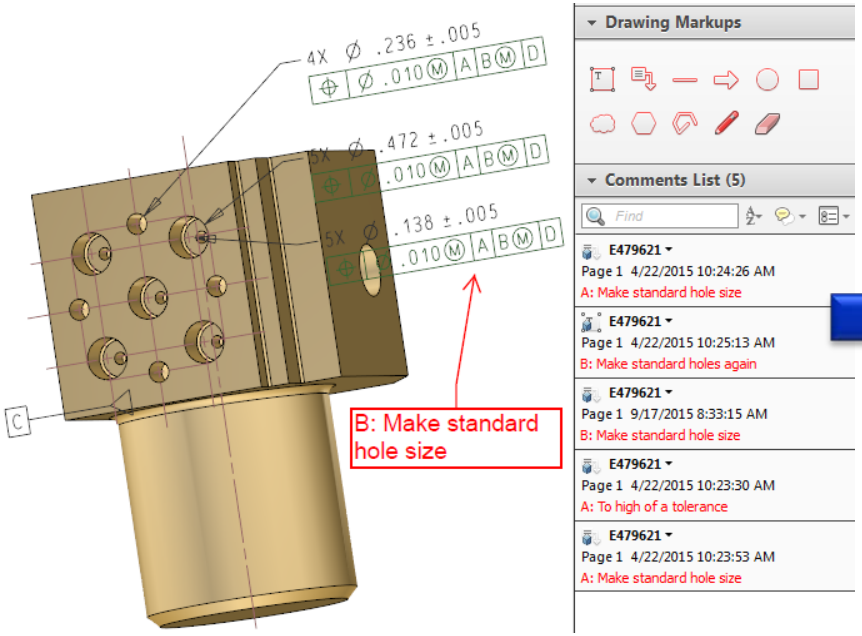


Storyboard – Feedback Import and Comment Extract





Data Consolidation / Comment Extraction – In Detail



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Edit	MBE67411677_1__3DPopup_PaulW.pdf	PaulW	asdef	1	FreeText	4/22/2015 3:09:39 PM	"A: chamfer size?"
Edit	MBE67411677_1__3DPopup_ComTest2.pdf	E479621	Cassavant	1	FreeText	4/22/2015 10:27:02 AM	"A: Relax the tolerance"
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Edit	MBE67411677_1__3DPopup_ComTest3.pdf	e276267	sa	1	FreeText	4/22/2015 11:56:13 AM	"C1: is this to the drill tip end or the start of the angle on the drill bit"
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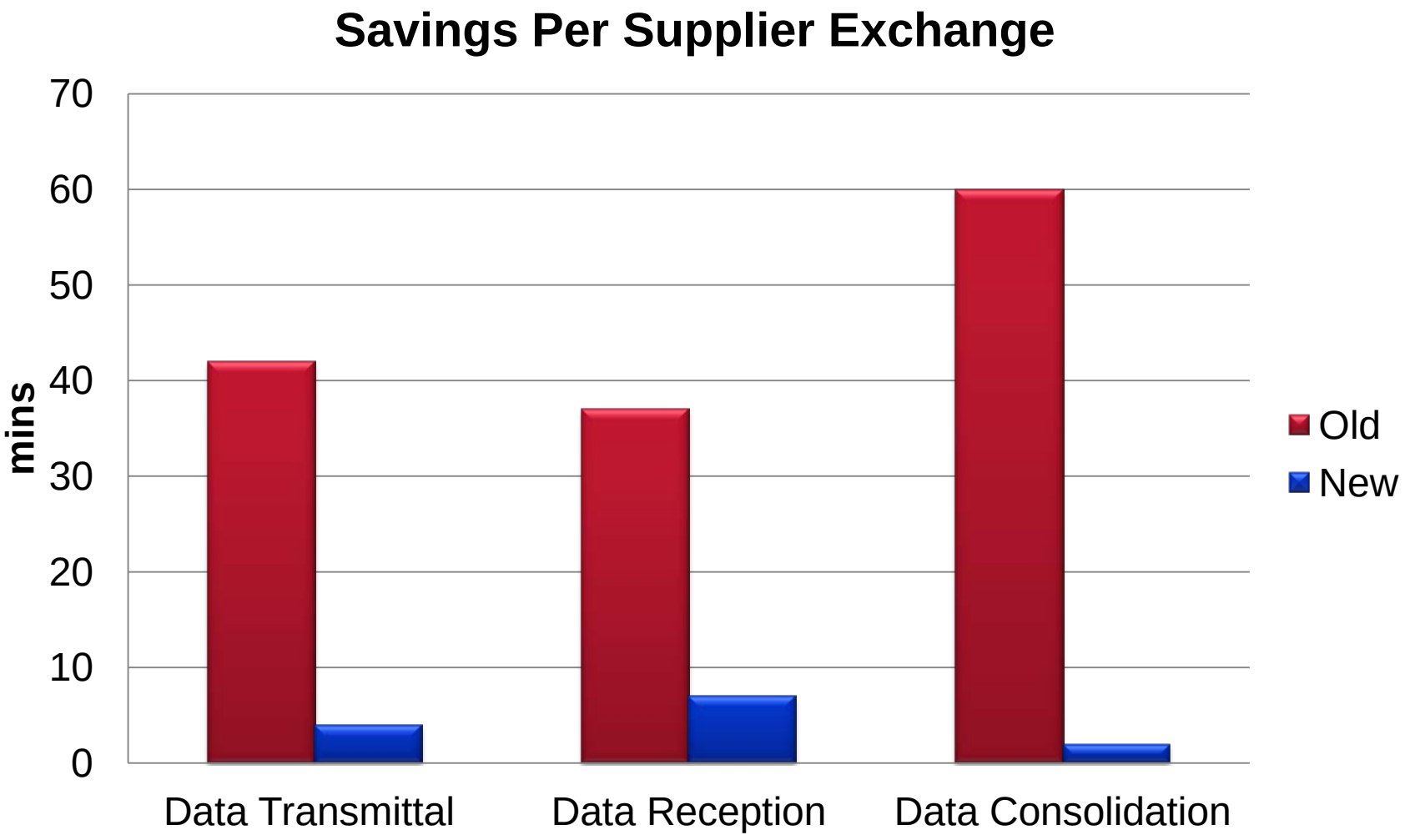
Edit	MBE67411677_1__3DPopup_ComTest1.pdf	E479621	Sagar INC	1	FreeText	4/22/2015 10:25:00 AM	B: Make standard holes again

Results

- **All inclusive supplier collaboration process**
- **One-stop-shopping tool**
- **Designers no longer required to support model exchange**
- **Ad hoc email is eliminated**
- **Mechanized approach to track supplier feedback**
- **Positive feedback from suppliers**
  - **Cover sheet aids in tracking and internal handling**
  - **“Can see what we’re bidding on with 3D PDF – quicker to plan tooling and fixturing”**
  - **Easier to work with their suppliers using TDP**

Productivity Savings



Challenges / Lessons Learned

- **User acceptance – Getting users to think past their specific role**
  - **Hard to understand requirements when the different personas not understanding the big picture**
- **Maturing SOA capability**
  - **Getting all the functionality in place**
- **Aligning with the business needs**
  - **What will help them now vs. help them later compared to the schedule**
- **Competing, vendor-based solutions in the marketplace**
  - **Encouraging proprietary vendor lock-in and increasing product cost**

Future Enhancements

- **Connecting more systems**
- **Expanded RFQ functions for concept phases**
- **STEP AP239/AP233 and AP242 utilities for supply chain use**
- **Data exchange traceability**
  - **Supplier 'Reply' function**
- **Automated metrics; data analytics**
- **Data extraction in context of orientation**
- **Increased Export Compliance robustness**
- **Data verification / certification**
- **Difference comparison & analysis**
- **Incorporation of more exchange standards**
  - **QIF: Quality Information Framework**
  - **EDX: PWA exchange format**

Questions?

Thank you!

Team members – Special thanks

- **John Russell**
- **Alejandro Ventura**
- **Patsy Pelayo**