PLM Road Map™ & PDT Europe 2023
The Digital Thread in a Heterogeneous, Extended Enterprise Reality
A call for PLM Professionals to share their knowledge & experience
November 15 & 16

AEROSPACE & DEFENSE PLM ACTION GROUP

Roadmap for Enabling Global Collaboration

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Presenters Bio

Robert Gutwein
PLM - Digital Technologies (DT)
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Pratt and Whitney Canada

Robert Gutwein joined P&WC in 1983 as a Design Engineer.

His interest in new technology morphed into his current role as the DT-PLM Collaboration and Data Transfer Subject Matter Expert (SME) and Team lead.

He has lead projects establishing PLM connections with customers, partners, suppliers and P&WC Satellite Engineering Office (SEO) sites worldwide.

He is involved with P&WC teams developing strategies to improve collaboration internally and externally following the TDP, LOTAR, MBD and industry guidelines and best practices.

Robert has a Bachelor of Applied Science in Mechanical Engineering and a Bachelor of Computer Science from the University of Windsor.

He is the Project Manager of the Global Collaboration Working Group within the Aerospace & Defense PLM Action Group.

He has recently taken on a new challenge as the RTX Industry Standards Coordination Lead in the area of MBDMI.

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Presenters Bio

Agnès GOURILLON-JANDOT
Deputy Director, Powerplant System Design Office
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Safran Aircraft Engines - France

Agnès GOURILLON-JANDOT is Senior Configuration Management Expert and has a leadership role in Digital Transformation at Safran Aircraft Engines in France

Agnès joined Safran Aircraft Engines (Snecma) in 1991 as a Design Engineer in the Standardization Team. Since 2000, she has been working in the Configuration Team, first as team leader and, for the past 16 years, as head of the Department, responsible for communication with Partners, Customers, Suppliers and Authorities. Her experience in Configuration led her to participate and advise on the implementation of two successive PLM solutions and currently on a third one.

Agnès has an Engineering degree in Mechanical Manufacturing – General Mechanics from ENI Belfort. She is an active participant in the Global Collaboration Working Group within the CIMdata-administered Aerospace & Defense PLM Action Group.

Agenda

- AD PAG Project Team
- AD PAG Global Collaboration Project History
- AD PAG Collaboration Guidelines
- Collaboration Management System (CMS) Application
- Collaboration Guidelines and CMS Application Pilots
- Accomplishment Summary and Go Forward Plan
- Q&A

Aerospace & Defense PLM Action Group

Founded in February 2014

Mission

An association of aerospace & defense companies within CIMdata's globally recognized PLM Community Program, which functions as a ***PLM advocacy group*** to:

- Set the direction for the aerospace & defense industry on PLM-related topics that matter to members
- Promote common industry PLM processes and practices
- Define requirements for common interest PLM-related capabilities
- Communicate with a unified voice to PLM solution providers
- Sponsor collaborative PLM research on member-prioritized industry and technology topics

Website: www.ad-pag.com

Members

AIRBUS, BOEING, GE Aerospace, Gulfstream, Pratt & Whitney, Rolls-Royce, SAFRAN

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A&D PLM Global Collaboration

Abstract (1 of 2)

- Collaboration among Original Equipment Manufacturers (OEMs) and their product design and manufacturing engineering partners and suppliers is key to any major aerospace and defense (A&D) program.
- Process analysis by an A&D PLM Action Group (AD PAG) project team has shown that the exchange of product data, such as 3D-MBD, Bill of Materials (BOM), and Model-Based Engineering (MBE), between multiple OEMs and suppliers presents a challenge within the industry.
- Currently, the exchange methods for long-term collaboration between OEMs and suppliers are independent and utilize exclusive environments and protocols, each unique and complex. Improving the consistency and efficiency of establishing and managing OEM-supplier collaboration can significantly improve cost, schedule, and quality across all phases of the product lifecycle.

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A&D PLM Global Collaboration

Abstract (2 of 2)

- This presentation offers a new "Desired State" for OEM-supplier collaboration through the application of and adherence to a set of guidelines defined by the project team.
- The A&D PLM Collaboration Guidelines lay out eight standard and repeatable steps for establishing and managing the environment where OEMs and suppliers collaborate.
- To facilitate the adoption of the A&D PLM Collaboration Guidelines, the project team has developed an open-service Collaboration Management System (CMS) web application.
- The CMS encapsulates and provides navigation through the eight-step guidelines and offers the potential to improve OEM-supplier collaboration consistency and efficiency within the A&D community.

A&D PLM Global Collaboration

Project purpose

- The Aerospace and Defense Product Lifecycle Management Action Group (AD PAG) is an association of aerospace Original Equipment Manufacturers (OEMs) and aircraft engine manufacturers within CIMdata's globally recognized PLM Community Program, which functions as a PLM advocacy group.
- One of the key business issues (i.e., pain points) identified by this industry group is that collaboration within a large, global, distributed supply chain of design and development partners is seriously hindered by relying on traditional, document-based development processes. As such, a major business challenge identified by the group is to achieve OEM and supply chain collaboration through bi-directional exchange of Technical Data Packages (TDPs) via digital tools and model-based processes.
- In response, a project team of domain experts from the AD PAG member companies was established to evaluate current collaboration practices.

A&D PLM Global Collaboration

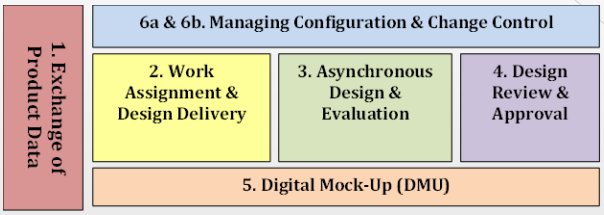
Ontology

- The **original use cases and collaborative concepts were evaluated** in the development of desired collaboration framework.
- To better understand the context of collaboration framework, **the key terms** that the team considered are identified in a word cloud.

A&D PLM Global Collaboration

Product data exchange – use case analysis

- Seven data exchange use cases were introduced in Edition 1(AS-IS)



- Further analysis revealed that the greatest near-term value opportunity lies in addressing the inconsistencies and gaps in process and protocols for establishing and managing the ongoing operation of the OEM–supplier collaboration environment
- This analysis led the team to define the 8 Step Global Collaboration Guideline outlined in Edition 2

A&D PLM Global Collaboration

Product data exchange – objectives for a near term future state

Current State Challenges

The AD PAG team identified the following five root cause categories leading to added complexity, potential confusion, and reduced productivity.

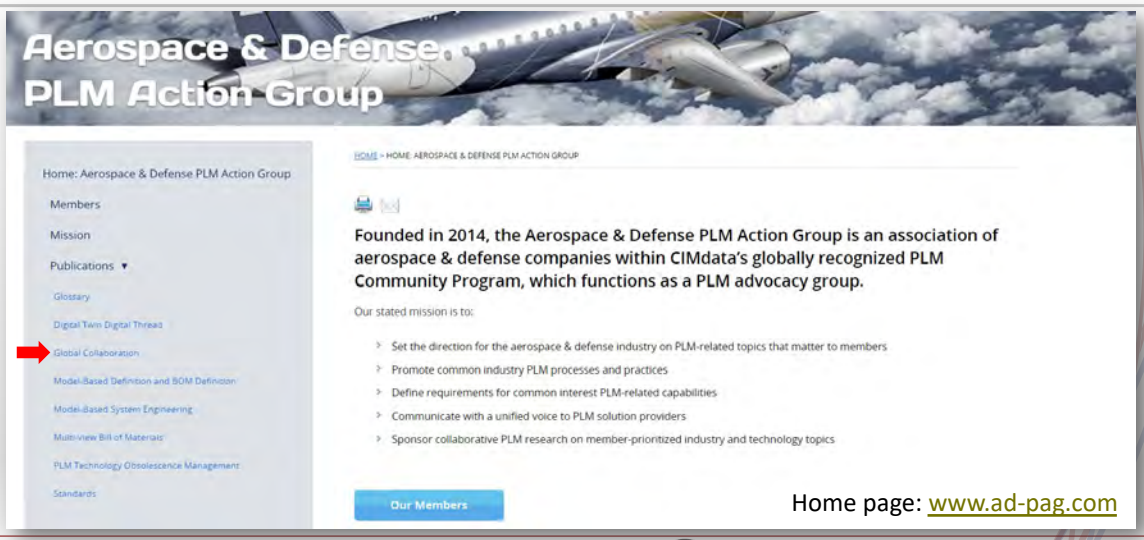
- Exchange – Non-standard data emailed without control; difficulty synchronizing files with various collaborators
- Conversion Validations – Lack processes to guarantee consistent and complete data
- Reconversion Validations – Lack confirmation to assure no data loss or corruption through multiple conversions
- Framework – Challenge to reach bi-directional agreement about the work content, information transfer mechanisms, and process for solving issues and escalations
- Governance – Export regulations issues if user does not know what export classification to associate with the data; IP data protection process must be negotiated and enforced between collaborative parties

Desired State Benefits

Fully interconnected collaboration that addresses the five root causes.

A&D PLM Global Collaboration

Publications



Home page: www.ad-pag.com

A&D PLM Global Collaboration

Collaborative Communities

- A collaborative community is **two or more people from different groups or companies working jointly** on a project.
- As shown in the following figure, a collaborative community's main **objective is to efficiently design, manufacture, and support components throughout their lifecycle.**

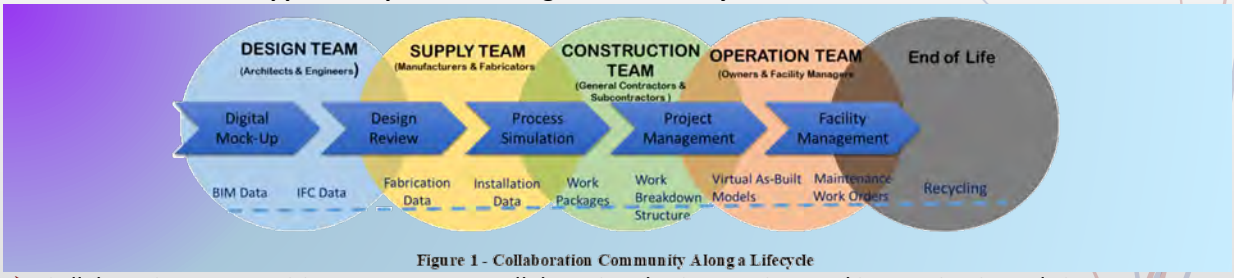


Figure 1 - Collaboration Community Along a Lifecycle

- Collaborative communities must support collaboration, brainstorming, and innovation in real-time.
- As stated in the Overview of the Desired Interactions between Business Entities section, collaborative community participants must also respect a common agenda to reach program milestones.

A&D PLM Global Collaboration

Evolution

SUPPLIER AGREEMENTS

NEED TO EVOLVE INTO FLEXIBLE CONTRACTS SUPPORTING MODEL-BASED DEVELOPMENT WITH ADVANCED COLLABORATION METHODS

DOCUMENT BASED DEFINITION of product with limited distribution and delayed communication through (paper, mail, scan/fax)

ELECTRONIC DEFINITION of product disrupted decades of industry standard practice with data transfer

CONNECTIVITY TECHNOLOGY, DATA FORMAT, intellectual property, and level of detail quickly rose as inhibitors to electronic data definition and transfer

COLLABORATION IS NEEDED during all phases of program lifecycle. Levels of frequency and volumes will vary at each phase, which will determine the level of interconnectivity and interoperability.

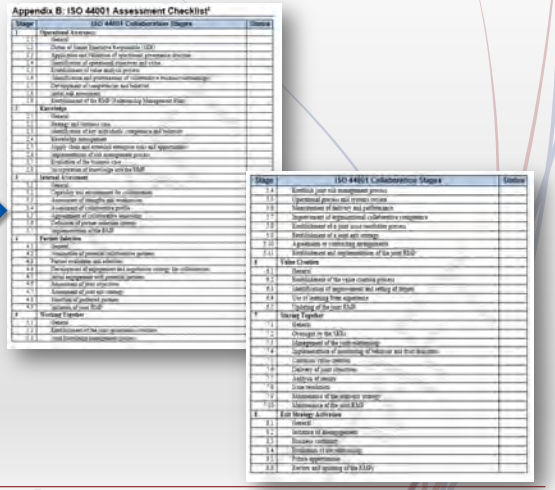
Evolution

AD PAG Collaboration Guidelines

Industry Standards

Standard	Publication Year	Title
ISO 11354	2011	*Advanced automation technologies and their applications — Requirements for establishing manufacturing enterprise process interoperability*
ISO 11354-2	2015	*Advanced automation technologies and their applications — Requirements for establishing manufacturing enterprise process interoperability — Maturity model for assessing enterprise interoperability*
ISO TR44000	2019	*Principles for successful collaborative business relationship management*
ISO 44001	2017	*Collaborative business relationship management systems — Requirements and framework*
ISO 44002	2019	*Collaborative business relationship management systems — Guidelines on the implementation of ISO 44001*
ISO 44003	2021	*Collaborative business relationship management — Guidelines for micro, small and medium-sized enterprises on the implementation of the fundamental principles*
ISO 44004	2021	*Collaborative business relationship management — Guidelines for large organizations seeking collaboration with micro, small and medium-sized enterprises (MSMEs)*
Mil Std 31000	Rev - 2009 Rev A - 2013 Rev B - 2018	Provides requirements for the deliverable data products associated with a TDP and its related TDP data

ISO 44001 Checklist



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AD PAG Collaboration Guidelines

Guidelines

A&D Collaboration Guidelines

1a. Prepare Recommended Collaboration for the Data Exchange Process

1b Assess Supplier Capabilities (4)

2. Commercial, Contractual and Legal Relationship

Done in parallel and can be done multiple times

3. Set up Governance (5)

4. Project management (1)

5. Set up Interfaces & organization (3)

6. Setup Collaboration Environment for Program Life

7. Program Review Process

8. End State (8) LoTAR

Objectives

- To optimize Collaboration supporting aerospace the A&D team developed and defined Aerospace Collaboration guidelines in Edition 2 paper
- These Guidelines evolved into a checklist which has been digitized into a web application Collaboration Management System (CMS)

Appendix A: A&D Collaboration Guidelines Checklist

Step	Global Collaboration Team Guidelines for A&D	Status
1	Prepare for Collaboration and Data Exchange	
1.1	Define Type and Scope of Data	
1.2	Define Recommended Way of Collaboration	
1.3	Define Recommended Project Management Terminology and Tool Set	
1.4	Define 9+ Compliant Process	
1.5	Assess Collaboration Capability	
1.6	Supplier Selection Arrangement	
1.7	Data Collaboration Agreement	
1.8	Audit and Follow-Up	
2	Establish Commercial, Contractual, and Legal Relationships	
2.1	Define Data Exchange Rules and Processes	
2.2	Define Project Management Terms	
2.3	Monitor and Manage Contract Execution and Contractual Coverage of	
2.4	Anticipate and Mitigate Contractual Risks	
2.5	Amend the Contract	
3	Set Up Governance	
3.1	Establish Import/Export Guidelines	
3.2	Determine Intellectual Property (IP)	
3.3	Implement Security Protocol(s)	
3.4	Protect Personal Identifiable Information	
3.5	Conduct Collaboration Platform Review(s)	
4	Establish Project Management	
4.1	Supply Chain Management	
4.2	Authority Delegation	
4.3	Planning and Measuring	
4.4	Risk Analysis	
5	Set Up Interfaces and Organization	
5.1	Nominate Focal Points	
5.2	Provide Access	
5.3	Define a Support System	
6	Set Up Collaboration Environment for Program Life	
6.1	Preparation	
6.2	Initialization	
6.3	Operation	
7	Conduct the Program Review(s)	
7.1	Prepare the Optimized Program Review	
7.2	Conduct the Program Review	
7.3	Follow Up and Close the Program Review	
8	Perform End State Tasks	
8.1	Review Data for Archiving	
8.2	Archive the Data	
8.3	Decommission the Program/Project Collaboration Space	
8.4	Manage the Contract Expiration and Close and Terminate the Contract	

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AD PAG Collaboration Guidelines

AD PAG Guidelines vs. ISO44001

- Industry specific vs. generic
  - The AD PAG 8 Step Guideline is specifically recommended for the Aerospace industry as defined by the AD PAG members.
  - ISO44001 is a generic standard for all industries.
- Tool prescriptive vs. tool
  - The AD PAG guidelines refer to the CMS App as tool to facilitate the definition of the stakeholder collaboration.
  - ISO avoids mentioning Collaboration tools.

AD PAG Collaboration Guidelines

Eight steps with sub-steps

AD PAG Collaboration Guidelines

Example – Step 4 sub-steps

Step 4
Establish Project Management

Step 4. Establish Project Management

Purpose: Establish a common means of collaborating and managing the engineering activity, including scheduling of activities, delivery, and performance measurement

Prerequisites:

- Type of contract has been determined (see Step 2)
- Contractual agreements include what types of data are exchanged, delivery dates, and costs
- Statement of Work is the technical work description

4.1 Supply Chain Management

A dedicated organization shall be put in place by Tier 1 for Tier 2 management with specific resources as applicable; the organization will:

- Manage the flow down of OEM requirements
- Deploy all applicable tools, methods, and training
- Commit to controlling and securing quality, on-time delivery of deliverables
- Demonstrate capabilities and practices for adequate control and management of deliverables

4.2 Authority Delegation

- Determine what tasks are to be performed
- Delegate those tasks as applicable

4.3 Planning and Measuring

- Provide reporting of deliverable progress (metrics)
- Define the term *late* (how does the OEM determine when items are late?)
- Plan for end-of-life of the program collaboration (see Step 8)

4.4 Risk Analysis

- Determine and mitigate any risks

Collaboration Management System (CMS) Application

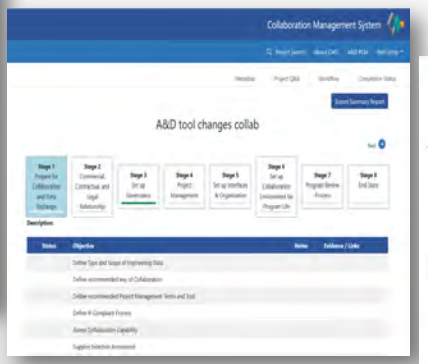
App and Documentation

- A&D Collaboration team worked with 3rd party (Talisen Technologies) to build the CMS Application to facilitate digital collaboration
- CMS Provides an optimized solution for how OEM/Supplier collaborations can be managed
- CMS Manages the 8 Step collaboration guidelines as a digital solution. CMS can also support the ISO collaboration guidelines.
- The CMS application is an open service solution supporting A&D Collaboration team strategy for digital collaboration industry engagement in a free cloud-based service via Talisen or an on-site solution with software licensing
- Requests from other software providers for Collaboration specifications and/or applications are welcome

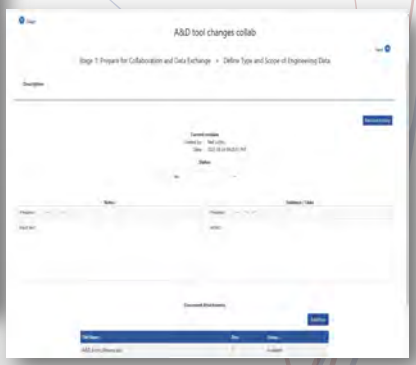
Collaboration Management System (CMS) Application

Embedding collaboration guidelines in a web-based application (1 of 2)

Project work queue
(initial window upon login)



Collaboration status view showing progression of project stages

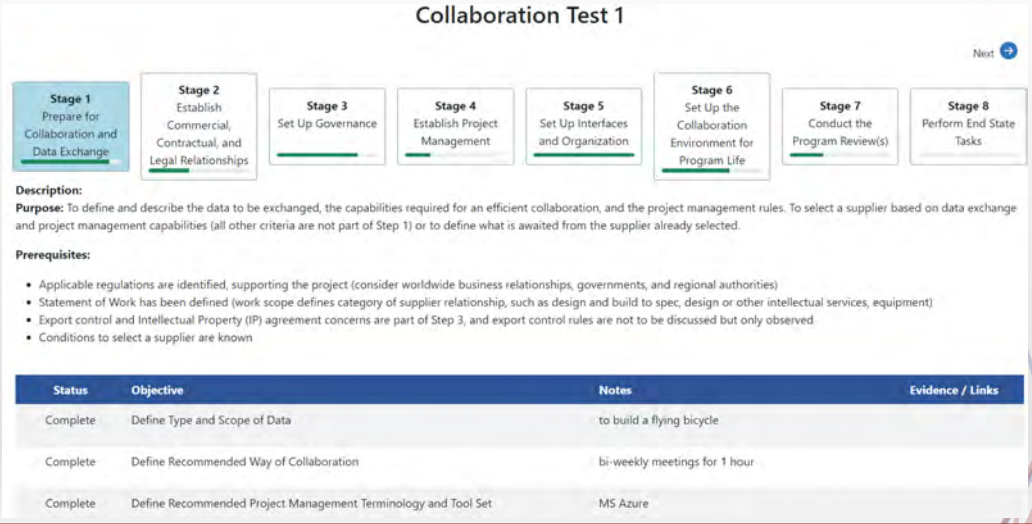


Individual collaboration objectives showing evaluation details including notes, deliverables and attachments

Images courtesy of Talisen Technologies

Collaboration Management System (CMS) Application

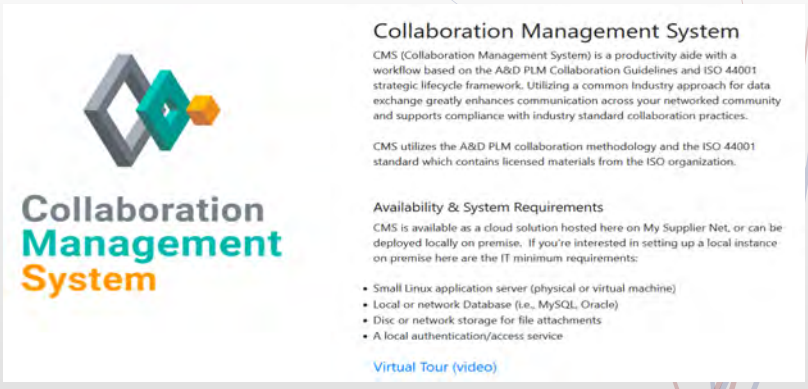
Embedding collaboration guidelines in a web-based application (2 of 2)



Collaboration Management System (CMS) Application

Video tour

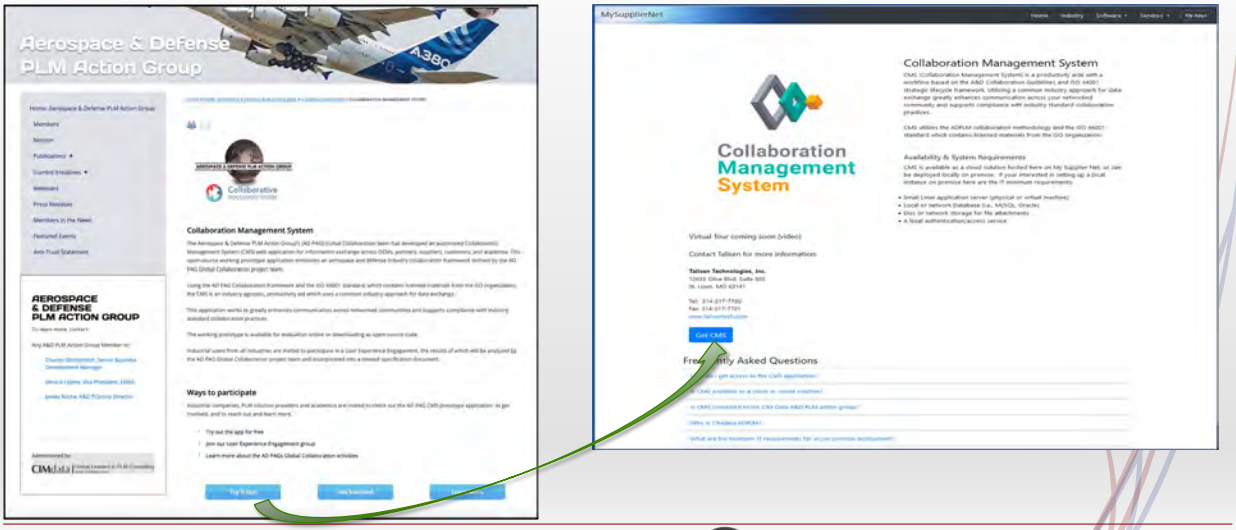
CMS Video



https://www.mysuppliernet.com/assets/videos/CMS.mp4

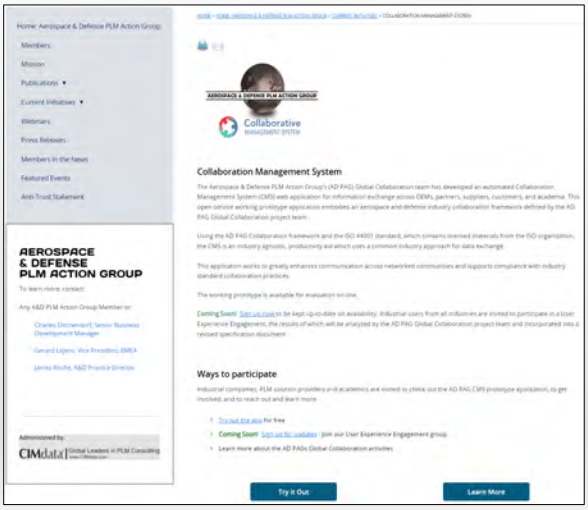
Collaboration Management System (CMS) Application

How to try it out and learn more (1 of 2)

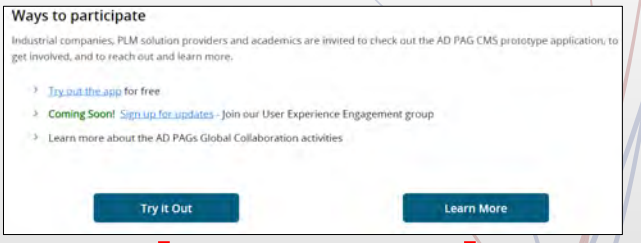


Collaboration Management System (CMS) Application

How to try it out and learn more (2 of 2)



Home page: https://www.cimdata.com/en/aerospace-and-defense/initiatives/cms



User Engagement

Proposition Papers

Guidelines and CMS Application Pilots

Conducted between AD PAG OEM – Supplier members

After making the Guidelines and CMS application available to the AD PAG Members, four members were asked to participate in pilots using them.

Two pilot teams were formed based on existing (retro-looking) and new (forward-looking) programs:

1. Retro-looking Pilot
2. Forward-looking Pilot

General Feedback

- Methodology provides guidance and rigor for collaboration, allowing team to get to MBE quicker
- Tool gives better understanding of SOW developed, specifically around OEM-Supplier agreements, which enable discussion on further aspects of collaboration
  - IT infrastructure
  - Data IP Rules
  - Data/project archival
  - Establishing Model Development Plans (MDPs)
  - Including model-based agreement, necessary to effectively execute a model-based collaboration
- Easier to re-use project information to stand up additional collaborations

Guidelines and CMS Application Pilots

Retro-looking pilot (1 of 2)

This pilot between 2 members was to determine if an on-going program/project could have been optimized if the CMS APP would have been available at the start. This involved the OEM, the primary supplier and the primary supplier's partner. The OEM requested a single access point for the prime and partner.

Looking back, we would have been able to connect the OEM and partners in a reduced cost and time frame if the CMS App had been available. We have been able to work in parallel between the three parties.

Feedback

- Structured method to define the elements required for collaboration.
- May not address fully implementing an OEM environment at Tiers 1 and 2
- Provides a central repository for Reference documents work procedures, standards, contracts, and other project relevant documents.
- Perhaps a section focusing on infrastructure should be added.
- Should capture lessons learnt. Will be helpful in future set ups.
- Greater detail on how to better manage best processes to improve performance of the application(s).
- Capture how to leverage appliable training requirements on systems and methodology across all stakeholders.
- The ability to capture and manage financials that were involved (such as new servers, network devices, and licensing costs for the app) should be considered.

Guidelines and CMS Application Pilots

Retro-looking pilot (2 of 2)

Summary

This framework had it been available would have assisted the stakeholders in setting up a collaborative environment in a cost-effective manner and perhaps reduced the time to start a project. The OEM knew all the components and infrastructure, the App and checklist would have provided a tool to ensure communication.

Documents, contractual items available to stack holders

The compliance matrix used seems to be a sub-set of the AD 8 Step Checklist

May not fully address how the approved network infrastructure available at OEM should be implemented.

OEM should work with supplier prior to proposing a solution be it infrastructure or methodology and requirements.

Can be used as a starting for the next collaboration project.

Guidelines and CMS Application Pilots

Forward-looking pilot (1 of 2)

Positive and Constructive Feedback

- Tool/methodology provides guidance and rigor for collaboration. The CMS framework enabled further discussion around specifics such as IT infrastructure, data IP rules, supplier-OEM agreements, and data/project archival.
- Tool gives better understanding of SOW developed, which could have been established in earlier phases of project. Specifically, around supplier-OEM agreements.
- Beginning of CMS framework could further address discussion around exploratory technology. For example, what systems, materials or manufacturing processes do the stakeholders have available to complete project goals. This would be discussed before technology selection.
- It was difficult for team to address program review questions within AD step 7 as a few did not apply. There was an ask to make these questions more agnostic around product reviews instead of program reviews.
- Perhaps the CMS questions could be better completed if set up in a requirement-verification-deliverable framework. There were questions around validation of answers, how do we know if answers to the framework were fulfilled?
- Of similar nature to validation, how can we further apply Measures Of Effectiveness (MOEs) to both the questions and project overall to ensure a quality deliverable.
- It would be useful to integrate a partnership between CMS and a development tool such as Supplier Requirements Exchange (SRX).

Guidelines and CMS Application Pilots

Forward-looking pilot (2 of 2)

Summary

This framework appeared to help guide conversation between the stakeholders for setting up a collaborative environment for improve the quality of a project.

It is a very project/program-oriented checklist.

- A checklist which is useful before starting the collaboration, but which is not necessarily the most suitable for R&T type projects vs. programs in development.
- Allows you to recall the fundamentals and the importance of establishing a SOW, which typically precedes the establishment of an agreement (legal side)
- Insists a lot more on IT interfaces/infrastructure, access authorizations, archiving than what we may be used to doing -> brings rigor.

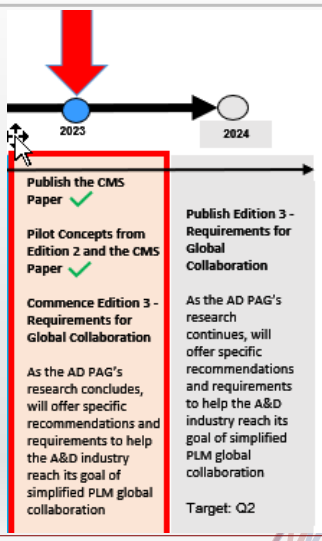
This checklist makes it possible to discuss certain subjects in advance of the signing of a collaboration agreement: export control, IP, termination clause, etc.

- Not necessarily a bad point knowing that the negotiation of an agreement can take time and is very often carried out in // activities.
- Not bad for risk management.

A&D PLM Global Collaboration

2023 accomplishments

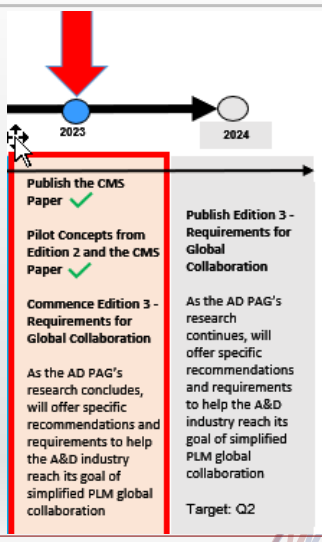
1. CMS Document & Application
   - Released CMS Document May 2023
   - CMS App made available to A&D PAG members
2. AD PAG Internal Pilots
   - A&D PAG Member Pilot completed on a current project, CMS feedback captured for use on future programs
   - A&D PAG Member retrospect Pilot started to identify Benefits and Gaps if the CMS tool had been available at the start of the Joint Collaboration program



A&D PLM Global Collaboration

2023-24 go forward plan

1. A&D PAG – Requirements for Global Collaboration
   - Target release Q2 2024
2. Edition 3 will address the Global Collaboration Project Assumptions and define the Recommendations and Conclusions of the A&D PLM Global Collaboration Working Group.



A&D PLM Global Collaboration

Questions

Questions ??

AEROSPACE & DEFENSE PLM ACTION GROUP

Back Up Materials

All 8 AD PAG Collaboration Steps

The Collaboration Standard Methods

Step 1

Step 1. Prepare for Collaboration and Data Exchange

Purpose: To define and describe the data to be exchanged, the capabilities required for an efficient collaboration, and the project management rules. To select a supplier based on data exchange and project management capabilities (all other **criteria** are not part of Step 1) or to define what is awaited from the supplier already selected

Prerequisites:

- Applicable regulations are identified, supporting the project (consider worldwide business relationships, governments, and regional authorities)
- Statement of Work has been defined (work scope defines category of supplier relationship, such as design and build to spec, design or other intellectual services, equipment)
- Export control and Intellectual Property (IP) agreement concerns are part of Step 3, and export control rules are not to be discussed but only observed.
- Conditions to select a supplier are known.

1.1 Activate Non-Disclosure or Confidentiality Agreements

- Define Agreements
  - Apply to involved staff prior to starting Collaboration
  - Read-in staff as required
- Monitor and update as required

The Collaboration Standard Methods

Step 1

1.5 Define IP-Compliant Process

- Review contractual IP expectations for each participating stakeholder and partner
- Expand upon contractually-defined IP protection
- Define and implement IP protection-compliant processes for the collaboration

1.6 Assess Collaboration Capability

Consider any supporting supplier assessment materials already collected or needed for the project collaboration. Refer to the *PLM Global Collaboration* (Edition 2) position paper for detail on types of suppliers.

Suppliers may be ranked using the following criteria:

- Media and transfer method
- Sending and receiving tool/systems
- Data structure/formats
- Standardization material and processes
- Design technical requirements
- Computer-Aided Design (CAD) files and metadata
- Filtering product structure
- Design data set
- Documents linked to the design data set
- Project-unique requirements
- Customer requirements

The Collaboration Standard Methods

Step 1

1.7 Supplier Selection Announced
- One supplier is awarded by the company to perform the activity

1.8 Data Collaboration Agreement
- Collaboration agreement, which includes the agreed upon mechanisms and formats for data exchange, is created and signed
- Collaboration agreement is part of the main contract

1.9 Audit and Follow-Up
- Plan audits such as those defined in the Step 3
- Perform audits
- Define corrective actions, if necessary
- Perform follow-up actions

The Collaboration Standard Methods

Step 2

Step 2. Establish Commercial, Contractual, and Legal Relationships

Purpose: To establish all commercial, contractual, and legal relationships about data exchange and project management

Prerequisites:
- Scope of Work, planning schedules, delivery contents, and delivery milestones are defined; work scope defines category of supplier relationship (e.g., design and build to spec, design or other intellectual services, equipment)
- Commercial aspects (price, payment, penalties, etc.) agreed; work scope evolution requests are the buyer's job and are **not** included in Step 2
- Commercial and technical business interfaces agreed to (focal points have been designated)
- Export control rules are not to be discussed but only observed and taken into account

2.1 Define Data Exchange Rules and Processes
- Data format(s) agreed upon for the exchange
- Data content and context
- Exchange frequency
- Work in shared session or Exchange mode (visible data, uploadable, downloadable)
- Define requested licenses and how to make them available

2.2 Define Project Management Terms
- Subsidiary, partner, or supplier management rules
- Milestones definitions
- Project reviews content and frequency
- Action plan monitoring
- Performance indicators
- Project management and action plan reviewing tools

The Collaboration Standard Methods

Step 2

2.3 Monitor and Manage Contract Execution and Contractual Coverage of Evolution Requests

- Deliverables' validation or rejection
- Project reviews
- Performance indicators review
- Corrective actions
- Change in design management

2.4 Anticipate and Mitigate Contractual Risks

- Shared risk analysis
- Shared mitigation action plan
- Mitigation actions monitoring
- Contract amendment, if necessary

2.5 Amend the Contract

- Security violation escalation
- Non-quality escalation
- Delay or postponement of deliverables
- Launching of recovery actions
- Contract interruption or extension

The Collaboration Standard Methods

Step 3

Step 3. Set Up Governance

Purpose: Where non-public data will be shared, rules and regulations must be defined and understood before any interaction with any supplier

Prerequisites:

- Dealing with participants from around the world, not just inbound/outbound United States
- Participating locations must be clearly specified
- Dealing with only the technical data, **not** the actual parts/deliverables (this makes a difference with export markings)
- Identified supplier is the company with whom contracted (i.e., the supplier is not necessarily the company who manufactures the item; could be using a second tier or third-party company, or may be a different derivative of the same company)
- Suppliers will manage their own supply chain
- Retention requirements have been determined (how long will data need to be kept?)

3.1 Establish Import/Export Guidelines

- What is the import company's country location?
- What is the export company's country location?
- What regulations apply? For example, the product could be imported from Europe and exported from Asia (US not involved))

3.2 Determine Intellectual Property (IP)

- What are the IP requirements for any given program?
- What are the rules?
- Who owns the data IP?
- Is it competition-sensitive data?
- Is it second tier or third-party data?

3.3 Implement Security Protocol(s)

- Is this classified or unclassified data?
- Is special access required?
- Is collaborating performed in a secured or unsecured space?
- How long must the data be kept by contract (i.e., data retention)?
- What are the access control policies?
- What is the disaster recovery plan?

The Collaboration Standard Methods

Step 3

3.4 Protect Personal Identifiable Information

- User attribute sharing: What information about a user can be shared publicly? If the users' names are going to be associated with the data, what information (e.g., user ID, citizenship, user location, etc.) can be displayed publicly?
- Are restrictions different per country? Per company?

3.5 Conduct Collaboration Platform Review(s)

The collaboration guidelines process supports collaboration platform review(s) and allows the stakeholders to assess the product and its constitutive elements for both the make and the buy activities in the frame of the Product Development Plan. Reviews ensure the product satisfies the contractual requirements and customer's expectations by checking solution compliance to technical, cost, and schedule objectives. The review process supports closure of a design phase and permits or denies transition to the next phase of the design build process.

This step involves agreement by all team members concerning the following:

- Milestones, deliverables, and measurement of Key Performance Indicators (KPIs)
- Checklist with acceptance criteria
- Change management process

Evaluate the collaboration platform on a recurring basis for performance, gaps, and improvements:

- Are all the *A&D Collaboration Guidelines Checklist* Steps 1-6 supporting the program review as planned, including program review milestone completion?
- Is the platform meeting the intended purpose for the project?
- Are there any open-step action items to be addressed?
- Do all participants have access as planned?
- Are there any limitations or roadblocks that need to be addressed?
- Does the platform support troubleshooting for the project collaboration?
  - Is the support structure put in place and rectifying issues?
  - Is a ticket service and/or support KPIs being met?

AD PAG Collaboration Guidelines

Step 4

Step 4. Establish Project Management

Purpose: Establish a common means of collaborating and managing the engineering activity, including scheduling of activities, delivery, and performance measurement

Prerequisites:

- Type of contract has been determined (see Step 2)
- Contractual agreements include what types of data are exchanged, delivery dates, and costs
- Statement of Work is the technical work description

4.1 Supply Chain Management

A dedicated organization shall be put in place by Tier 1 for Tier 2 management with specific resources as applicable; the organization will:

- Manage the flow down of OEM requirements
- Deploy all applicable tools, methods, and training
- Commit to controlling and securing quality, on-time delivery of deliverables
- Demonstrate capabilities and practices for adequate control and management of deliverables

4.2 Authority Delegation

- Determine what tasks are to be performed
- Delegate those tasks as applicable

4.3 Planning and Measuring

- Provide reporting of deliverable progress (metrics)
- Define the term *late* (how does the OEM determine when items are late?)
- Plan for end-of-life of the program collaboration (see Step 8)

4.4 Risk Analysis

- Determine and mitigate any risks

The Collaboration Standard Methods

Step 5

Step 5. Set Up Interfaces and Organization

Purpose: The interface(s) between participants shall be clearly defined to enable a clear-cut and efficient collaboration between the OEM Information Technology (IT) services and the supplier from deployment to the run mode. This step also requires that the supplier shall nominate key Information System (IS)/IT representatives strictly in a timescale to meet the contract requirements

Prerequisites:

- Participants have IT infrastructure in place
- Proposed collaborative system(s) is flexible/scalable to support the business need
  - Service Level Agreement is defined in the contract (see Step 2), which can include problem triage and resolution
- Preliminary assessment of quantity of users, data to be exchanged, and duration of the use has been determined
- Collaboration administration to be determined based on contract/team agreement

5.1 Nominate Focal Points

Determine a primary contact who is responsible for the overall coordination of activities related to the program, which include but are not limited to:

- Ensuring that their company's IS/IT organization is in place
- Distributing any OEM IS/IT solution updates
- Maintaining a list of key IS/IT contacts for the roles described in this document
- Securing the communication and skills across the specific IS/IT community.
- Updating any hardware/software

The Collaboration Standard Methods

Step 5

5.2 Provide Access

Designate an appropriate representative who is responsible for:

- Set up and management of the collaboration environment
- Hardware set up
- Software set up
- Account set up and role assignment
- Creation, maintenance, and deletion of user accounts
- Data archiving/data retention rules
- An exit strategy
- Decommissioning the collaboration environment

5.3 Define a Support System

IT contact shall provide the first level of IS/IT support and serve as the focal point for respective users working with specified IS/IT solutions by ensuring:

- Regularly scheduled status/touch point meetings with IT and OEM
- Meetings can include but are not limited to audits, software/hardware upgrades, and/or migrations

The Collaboration Standard Methods

Step 6

Step 6. Set Up the Collaboration Environment for Program Life

Purpose: Implement a system-neutral collaborative platform and determine the IT administration environment set up, configuration, and maintenance

Prerequisites:

- Supplier has been selected and is "On Contract"
- Collaboration platform is the central workspace
- Regulations, such as export, have been determined (see Step 2)
- Collaboration requirements of Steps 1-5 are complete.

6.1 Preparation

- Define collaboration rules, such as:
  - Central workspace for native or converted data
  - Mapping of attributes (issue, status)
  - Read-only versus In-work
  - Versioning (configuration control of data)
- Define common "libraries" like standard parts
- Provide partners access to the collaborative platform
- Determine connectivity (how each environment is connected)
- Implement collaboration access rules

The Collaboration Standard Methods

Step 6

6.2 Initialization

- Fill the collaboration platform with data taking IT security agreements into account (see Step 3)
- Determine environment reusability of existing data in the collaboration platform (if applicable)
- If needed, convert data to the agreed format (proprietary or neutral), including validation (quality)

6.3 Operation

- Event-driven update of collaboration platform
- Ensure latest revision is available
- Run reviews and design solution
- Event-driven update of local IT-systems

The Collaboration Standard Methods

Step 7

Step 7. Conduct the Program Review(s)

Purpose: Collaboration guidelines support program review(s) and allow the stakeholders to assess the product and its constitutive elements for both the make and the buy activities in the frame of the Product Development Plan. Reviews ensure the product satisfies the contractual requirements and customer's expectations by checking solution compliance to technical, cost, and schedule objectives. The review process enables closure of a design phase and permits or denies transition to the next phase of the design build process.

Prerequisite:

The collaboration process guidelines enable the collaboration platform, ensuring effective program reviews

7.1 Prepare the Optimized Program Review

The platform facilitates the evolution of the Program Review Process and development status. Program Review preparation is minimized because the latest data is available to all parties

- Review objectives and success criteria
- Review panel – Roles, Responsibilities and Authorities (RRA)
- Initiate continuous review process

7.2 Conduct the Program Review

- Ask: Do the deliverables meet the design intent?
- Review the methodology
- Review the data – models/drawings, specifications
- Complete the review checklist

The Collaboration Standard Methods

Step 8

Step 8. Perform End State Tasks

Purpose: To define a method of operation once the program has reached maturity or its end of life. Determine who is responsible for maintaining the collaboration final data (owner of type certification); decommission of the collaboration platform

Prerequisite:

Related data types and formats are defined in the contract

8.1 Review Data for Archiving

- Review and categorize data for potential re-use and archival; different data types need to be archived:
  - Data for regulatory authorities (depending on work package type)
  - Governmental requirements
  - All other program related data (e.g., all reports, calculations, etc.)
- Determine which party is responsible for archiving which data

8.2 Archive the Data

- Determine the CAD/Product Data Management (PDM) data to be archived
- Prepare documents and other data for archive in the agreed-to, contractual, standard format
- Align the archive date to the LoTAR standard

The Collaboration Standard Methods

Step 8

8.3 Decommission the Program/Project Collaboration Space

- Clarify if the collaboration space could be re-used, and evaluate if the data is potentially applicable for other projects
- Determine if the space will not be re-used; if that's the case, decommission the collaboration space
- Deactivate synchronization processes, user IDs, etc.
- Determine a method for emergency or on-demand exchange (i.e., a low-volume exchange process)
- Address any remaining contract elements
- Decommission the collaboration space

8.4 Manage the Contract Expiration and Close and Terminate the Contract

- Handover of all deliverables, including hardware and software
- Proof of data archival or destruction
- Establishment of a plan for project closure