

# *Multiple View Bill of Materials (BOM)*

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Appendix A: Glossary

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**AEROSPACE & DEFENSE PLM ACTION GROUP**

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# Revision Record

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Release	Date	Description
1.0	January 2019	Initial Release

# *Multiple View Bill of Materials (BOM)*

## Appendix A: Glossary

### Introduction

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A major barrier that emerged immediately during the first Aerospace & Defense PLM Action Group (AD PAG) multi-view BOM workshop in March 2017 was the inability of the assembled experts from seven member companies to effectively communicate due to their use of different terms for similar concepts (or sometimes even use of the same term for contradictory concepts). To overcome this obstacle, the first sub-project chartered by the team was to develop a shared glossary of terms with strong reliance on industry-accepted publications such as EIA-649, EIA-836, and ATA Spec 2000.

The result is a list of agreed upon terms with precise definitions, the source (if directly adopted or based on an industry publication), and a list of synonyms. The goal of the glossary is to support effective communication throughout the aerospace and defense industry and to promote incorporation of common language within future PLM solution provider offerings and documentation. The *AD PAG Multiple View Bill of Materials Glossary* will be enhanced to include future subjects and planned updates to the position paper. The released version of the glossary is available for public download at [www.ad-pag.com](http://www.ad-pag.com).

### Problem Statement

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As a result of adopting PLM solutions from different software providers, as well as developing different processes to tackle similar business use cases, Original Equipment Manufacturers (OEMs) – in isolation from each other – have historically created very different vocabularies to describe similar concepts. The business consequence is an overall inability for experts in the field to communicate effectively.

This inability to communicate exists in a range of contexts:

- AD PAG members with their supply chain
- AD PAG members with software providers
- AD PAG members with other AD PAG members (e.g., Airbus-with-Rolls-Royce)
- Even SMEs with SMEs within an AD PAG member company

The project team members recognized that with such a major barrier to effective communication, it would be virtually impossible to exchange information necessary to define and solve problems in this domain. Agreement was unanimous that the highest priority and first sub-project would be to create a shared glossary.

## Desired State

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Going forward with a common glossary, especially one with cross-references to terms used within each member company, the barrier to communication is mitigated and real progress on persistent problems in management of multiple-view BOMs becomes possible.

The first business benefit of the glossary is that it supports effective communication between the AD PAG project team members. The team members are now able to proceed with their defined sub-projects to overcome multiple-view BOM related pain points.

The second benefit is that it supports effective communication with external parties, such as PLM software providers, by providing a precise vocabulary for use in all technical documents released by the project team.

# Glossary

Acronym or Term	Definition	Source of Definition	Synonym
150% BOM	Union of all EBOM elements for all Aircraft Identification Numbers of specific product.	CIMdata AD PLM AG – Multi-view BOM project team	Super BOM, Overloaded BOM, Unconfigured BOM
Accountability conflict	Configuration mismatch between EBOM and MBOM for a dedicated Aircraft Identification Number as described in the Accountability Map.	CIMdata AD PLM AG - Multi-view BOM project team	
Accountability Map	A Set of rules that evaluate the authority effectivity and ensure / enforce that manufacturing effectivity changes are equal to the authority effectivity. Rules also cover quantity and part number, manufacturing only changes, substitute and optional parts checks to ensure compliance between two structures such as e-BOM, m-BOM, BOP, and S-BOM if any.	CIMdata AD PLM AG - Multi-view BOM project team	
Aircraft Identification Number	The manufacturer's permanently-applied serial number for the airframe.	ATA_SPEC-2000_2011-01	MSN

Acronym or Term	Definition	Source of Definition	Synonym
Alternate Part Number	<p>A part that fully meets required functional and 106, 2200, structural specifications of the primary part number, and is approved for use in lieu of the primary part number</p> <p>Specific: A part that fully meets required functional and structural specifications, but differs either in overall dimensions, connections, installations and/or mounting provisions and requires additional parts, rework or modification to install it as an alternative to the primary part. The understanding of Alternate Part Number must be considered in relation with certification Part 21 and Part 145. Alternate part must be defined as global or local.</p>	ATA_SPEC-2000_2011-01	Interchangeable, Optional part, Substitute, Replaceable
As-Built	The configuration of a product instance after completion of build per the As-Planned baseline as reflected in records of completed work. May differ from As Planned baseline due to resolution of nonconformance and other exceptions reflected in the records of completed work, which comprise the As Built baseline.	As per LOTAR	
As-Designed	The approved design (under revision control). Differs from In Development in that it only includes design at a status which authorizes use in the As-Planned baseline.	As per LOTAR	
As-Maintained	The configuration of a product instance as repairs and modifications are incorporated over its lifecycle as reflected in records of completed work. Depending on organization and use case, As-Maintained may also be defined as data providing design available for incorporation into units in operation, but another organization is responsible for completing incorporation (e.g., airline).	As per LOTAR	

Acronym or Term	Definition	Source of Definition	Synonym
As-Planned	The manufacturing product structure. Differs from the As-Designed baseline by only including elements with effectivity applied (i.e., resolved), possibly reorganized for manufacturing, and consumables added.	As per LOTAR	
Assembly	A group of items that can be treated as a single item.	CIMdata AD PLM AG – Multi-view BOM project team based in EIA-836-A 2007	
Assembly Line	The physical location where the certified end product (complete aircraft or other major end items) is achieved (including testing). It is based on manufacturing and assembly skills assuring product compliance to the specified requirement in a repetitive manufacturing environment.	CIMdata AD PLM AG – Multi-view BOM project team	Final Assembly
Base Number	Identifier for parts within the same family (variants and evolutions).The concept applies to parts, installations, and assemblies.	CIMdata AD PLM AG – Multi-view BOM project team	
Business Object	Artifact created in the PLM system to support the definition of an item.	CIMdata AD PLM AG – Multi-view BOM project team	

Acronym or Term	Definition	Source of Definition	Synonym
Conditions of Supply	<p>The form of a part as delivered by a supplier that deviates from the final engineering definition. It could be a part or an assembly. This intermediate definition can be required, according to industrial constraints, to map with requirements from the manufacturing integrator to ensure or perform:</p> <ul style="list-style-type: none"> <li>– logistic manipulations (e.g., Lugs allowing to assist handling operations),</li> <li>– assembly/installation operations of mechanical sub-assemblies (e.g., pilot holes),</li> <li>– ground tests at assembly/installation stages (e.g., tubes or pipes over-length),</li> <li>– late post machining operations (e.g., over-thickness, extended surface).</li> </ul> <p>Conditions of Supply are derived from assembly constraints and deal with condition of delivery of an Aircraft Constituent Item. They can be requested by manufacturing or Customer Support.</p>	CIMdata AD PLM AG – Multi-view BOM project team	
Configuration Change	An alteration to a product and/or its product configuration information (as documented in a request for change).	EIA-649-A 2004	
Configuration Control Zone (CCZ)	A boundary that enables to define business rules around our interaction with data contained within and that is managed within the same scope as the master object. It is not necessarily a formal group of data with an identification number. CCZ enables life cycle dependencies between different objects.	CIMdata AD PLM AG – Multi-view BOM project team	
Configuration Identification	The CM function which (1) establishes a structure for products and product configuration information; (2) selects, defines, documents, and baselines product attributes; and (3) assigns unique identifiers to each product and product configuration information.	EIA-649-A 2004	

Acronym or Term	Definition	Source of Definition	Synonym
Configuration Management (CM)	<p>A process that establishes and maintains consistency of a product's attributes with its requirements and product configuration information throughout the product's life cycle.</p> <p>The five CM functions are 1) Configuration Management Planning and Management, 2) Configuration Identification, 3) Configuration Change Management, 4) Configuration Status Accounting, and 5) Configuration Verification &amp; Audit.</p>	EIA-649-A 2004	
Dash Number	The alphanumeric assignment applied after the base number to uniquely identify the part. As an example: Base number + Dash number = Part Number. Dash number changes due to FFF (Fit, Form, Function) changes.	CIMdata AD PLM AG – Multi-view BOM project team	
EBOM	<p>The product structure breakdown representing the As-Designed engineering view.</p> <p>EBOM: Engineering Bill of Material</p>	CIMdata AD PLM AG – Multi-view BOM project team	
EBOM Change	<p><u>Product and configuration changes</u> made to an Engineering Bill of Material (EBOM). They include:</p> <ul style="list-style-type: none"> <li>- Engineering effectivity changes</li> <li>- Items definition changes</li> </ul>	CIMdata AD PLM AG – Multi-view BOM project team	

Acronym or Term	Definition	Source of Definition	Synonym
Effectivity	A designation defining the product or product range; e.g., serial numbers, lot numbers, model, dates, or event at which the usage of a specific product configuration applies, a change to a specific product is to be or has been impacted, or to which a variance applies.	Based in EIA-649-A 2004	Applicability
Effectivity Incorporation Point	The event, date, or product identifier at which the engineering usage of a specific product changes.	CIMdata AD PLM AG – Multi-view BOM project team	
Effectivity Expression	A logical expression (usually expressed in Boolean logic) used to determine the effectivity of the element to which it is applied.	CIMdata AD PLM AG – Multi-view BOM project team	Effectivity Statement
2D Drawing	A Document that discloses (directly or by reference), by means of graphic or textual presentations, or by combinations of both, the physical or functional requirements of an item. An engineering drawing may also describe requirements for disposal, distribution, maintenance, manufacturing and build, operations, packaging, quality management, test, and training of a product.	Based on Engineering Drawing from EIA-836-A 2007	
Engineering Only Assembly	Part with no counterpart linked to a Manufacturing Bill of Material (MBOM). Its components are consumed as individual parts in the MBOM.	<u>CIMdata AD PLM AG – Multi-view BOM project team</u>	Product of Convenience, Make On Assembly, Phantom Assembly

Acronym or Term	Definition	Source of Definition	Synonym
Equipment	<p>A combination of parts, components, accessories, attachments, firmware, or software that operate together to perform a function(s) within a System/Sub-System Architecture, as, or for an end-item or a system. Equipment may be a subset of an end-item based on the characteristics of the equipment. Equipment that does not meet the definition of an end-item is a component, accessory, attachment, firmware, or software.</p> <p>Equipment are certified end items, per TC (Type Certificate), TSO, or equivalent standard, supplied by external companies and their support and spares are under the original suppliers' responsibility.</p>	CIMdata AD PLM AG – Multi-view BOM project team	
Facility	Any permanent, semi-permanent, or temporary structure used in the creation or support of a product or performance of a service. This includes buildings and other structures, their functional systems, and equipment, including site development features such as landscaping, roads, walks, and parking areas, outside lighting and communications systems, central utility plants, utilities supply and distribution systems, and other physical plant features.	EIA-836-A 2007	Factory, Site
FFF	Fit Form Function (acronym)	CIMdata AD PLM AG – Multi-view BOM project team	
Fit	The ability of a product to interface or interconnect with, or become an integral part of, another product.	EIA-649-A 2004	

Acronym or Term	Definition	Source of Definition	Synonym
Fly-Away Item	Item subject to an identified interface with the aircraft definition and certified to be installed in an aircraft	CIMdata AD PLM AG – Multi-view BOM project team	
Form	The shape, size, dimensions, and other physically measurable parameters that characterize a product	EIA-649-A 2004	
Function	The action or actions that a product is designed to perform	EIA-649-A 2004	
Functional Part Number	Identifies all parts that are interchangeable at assembly but may have differences in physical characteristics or assembly components.	CIMdata AD PLM AG – Multi-view BOM project team	REF DES, Equipment, Stable ID, Significant Item Number
In Development	Records the product design while it is being matured	As per LOTAR	
Installation	A grouping of parts and processes that are designed within the context of a higher-level assembly or end item using references to interfacing parts and designs. These references within an installation design are significant because they allow installations to be independent from each other from a part number control perspective. Installations are typically single <u>usage</u> within the product and are non-storable.	CIMdata AD PLM AG – Multi-view BOM project team	Design Solution

Acronym or Term	Definition	Source of Definition	Synonym
Invariant	<p>Artifact created in the PLM system to group items fulfilling the same function along the product lifecycle.</p> <p>It may represent intermediate steps of design, manufacturing, etc. to allow the procurement and integration of parts without directly handling the item's part number.</p> <p>Invariants placed in the product structure stop change propagation to the next higher assemblies.</p>	CIMdata AD PLM AG – Multi-view BOM project team	<p>Modules in Boeing</p> <p>- CIs in Airbus &amp; Embraer</p> <p>- Reference Designator in Boeing and Gulfstream, FIN-CI in Airbus.</p>
Manufacturing Only Assembly	<p>Assembly (or Installation) used primarily in Manufacturing Bill of Material (MBOM) restructuring to optimize assembly activities by merging or splitting engineering items. Manufacturing Only Assemblies are created by Manufacturing Engineering / Production organizations with no Fly-Away (engineering) part number counterpart linked to an EBOM.</p>	CIMdata AD PLM AG – Multi-view BOM project team	
Manufacturing Plan	<p>Document setting out the specific manufacturing practices, technical resources, and sequences of activities relevant to the production of a particular product including any specified acceptance criteria at each stage.</p> <p>This plan should make reference to applicable methods, procedures, and work instructions.</p>	EIA-836-A 2007	Installation Plan, Work Order

Acronym or Term	Definition	Source of Definition	Synonym
MBOM	<p>The As-Planned product structure breakdown that represents the manufacturing view of the As-Designed configuration. It creates a logical sequence to assemble the end product. MBOM uses an indentured, descriptive, and quantitative listing of all components, subassemblies, and raw materials that go into a parent assembly or installation. It identifies what is to be bought and/or manufactured to provide delivery of business segment products.</p> <p>MBOM: Manufacturing Bill of Material</p>	CIMdata AD PLM AG – Multi-view BOM project team	
MBOM Change	<p>Product and configuration changes made to a Manufacturing Bill of Material. They include:</p> <ul style="list-style-type: none"> <li>- Changes pushed by EBOM changes</li> <li>- Breakdown and effectivity changes due to merging and splitting of MBOM</li> <li>- Creation of Manufacturing Only Assemblies</li> </ul>	CIMdata AD PLM AG – Multi-view BOM project team	
Merge Restructure	<p>Action of joining two or more EBOM in one single MBOM for an installation activity.</p>	CIMdata AD PLM AG – Multi-view BOM project team	
Metadata	<p>1) Information about data 2) Content model datatype, identification references, and other “atomic” properties associated with the character data or child elements of the associated element.</p>	EIA-649-A 2004	

Acronym or Term	Definition	Source of Definition	Synonym
Next Higher Assembly	Installation or Assembly where an item is used.	CIMdata AD PLM AG – Multi-view BOM project team	Parent Assembly
Orphan Item	Product Structure items not linked to any next higher assembly.	CIMdata AD PLM AG – Multi-view BOM project team	
Part	"The elements that identify: 1) A part or material that forms a portion of an assembly or subassembly, or 2) A part or material that forms a piece of a group designated for a specific purpose. The group may serve a purpose together, like a modification kit, or may be totally dissimilar things, like those put together for a shipment."	EIA-836-A 2007	Item
Part Description	The textual description or functional name given to an equipment item, manufacturer proprietary part, or standard part.	ATA_SPEC- 2000_2011- 01	
Part Number Roll	The re-identification criteria (part number controlled) where the dash number of the part number rolls to the next higher available number.	CIMdata AD PLM AG – Multi-view BOM project team	
Occurrence (Absolute)	Identifies within a product (root) a specific part, function, logic, or requirement. This identification can be qualified with configuration, knowledgeable attributes, such as absolute position within the product, functional data (ATA, etc.). An absolute occurrence is derived from a set of one or more relative occurrences.	CIMdata AD PLM AG – Multi-view BOM project team	Instance, Usage

Acronym or Term	Definition	Source of Definition	Synonym
Occurrence (Relative)	Direct relationship between a parent and a child object. This identification can be qualified with configuration, knowledgeable attributes, such as relative position within its parent, functional data (ATA, etc.).	CIMdata AD PLM AG – Multi-view BOM project team	Usage, Instance, Assembly Relation.
Part Number	Name or alphanumeric identifier, unique to the issuing organization, used to designate products of the same configuration and to differentiate them from other products.	EIA-649-A 2004	Product Identifier, Identifier
Physical Part Number Control	Assignment of part number controlling part definition. Part may be used in any aircraft and a new identifier is assigned whenever a variation in attributes can have a meaningful effect on the item's form, fit, or function (FFF) in the application.	CIMdata AD PLM AG – Multi-view BOM project team	
Product	Intended or accomplished result of labor or of a natural or artificial process	As per LOTAR	
Product Change	Term used to identify any configuration variation in a product structure whether by change to the aircraft standard definition, customer technical definition, or by the introduction of improvements and all under the surveillance of the authorities. Within group activities, change triggers EBOM and MBOM changes.	CIMdata AD PLM AG – Multi-view BOM project team	

Acronym or Term	Definition	Source of Definition	Synonym
Product Data Management (PDM)	Solutions used within an enterprise with methodologies to organize, access, and control data related to its products. A single PDM solution may work with CAD, CAM, and CAE, other software applications, and with traditional non-computer systems that generate or use product data (such as digitalized documents or index of paper documents). It also provides access and security controls, maintains relationships among product data items, enforces rules that describe and control data flows and processes and provides notification and messaging facilities. PDM systems are used by managers, administrators, and end users.	Based on CIMdata Glossary	
Product Lifecycle	Period from the conceptual idea to the ultimate disposal of a product	As per LOTAR	
Product Lifecycle Management (PLM)	The tracking, control, and status control of product data, either as files or through a database. PLM extends the scope of PDM to include each physical product produced from a design, including deviations from the design and usage of the product.	As per LOTAR	
Product Management Data	The data describe the primary technical data generically in a PDM framework, independent of their specific type (e.g., CAD data), which are described in the domain specific parts of EN 9300 series.	As per LOTAR	

Acronym or Term	Definition	Source of Definition	Synonym
Product Structure	A hierarchical view of the relationship of products and component products	EIA-649-A 2004	
Production Line Number	The number assigned to each production airplane that describes the build sequence through in the production order base.	CIMdata AD PLM AG – Multi-view BOM project team	Production Rank, Line Number
Quantity	Unit of measure for parts, components, etc. to be ordered, installed, or removed.	ATA_SPEC-2000_2011-01	
Revision	<p>Technical update of an existing Part Number definition without <u>Part Number roll</u>.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• Part Number A111111111-2 is released with Revision A (issue is not stamped on physical parts).</li> <li>• If a change modifies Form, Fit or Function (FFF), Part Number rolls to A111111111-3</li> <li>• If a change does not modify FFF, Part Number A111111111-2 is updated and released with Revision B (no Part Number roll)</li> </ul>	CIMdata AD PLM AG – Multi-view BOM project team	Issue, Version

<b>Acronym or Term</b>	<b>Definition</b>	<b>Source of Definition</b>	<b>Synonym</b>
Serial Number (S/N)	Used to identify individual units within an item family. Serial numbers shall be used when identical parts or kits having the same part number must be distinguished from each other for tracking in service, and lot or batch identification is not sufficient. They provide for traceability of items that are manufactured, tested, and operated individually and can be used to determine the physical location of a particular item on a particular aircraft.	ATA_SPEC-2000_2011-01	
Specified Item	An item for which a specification is issued and addressed to one or several supplier(s) possessing the know-how in terms of technologies and techniques to manufacture the item. Supplier(s) will perform the detailed definition, design, and complete development (manufacturing, testing, etc.).	CIMdata AD PLM AG – Multi-view BOM project team	Supplier Controlled Drawing, Source Control, Specification Drawing
Split Restructure	Action of separating one EBOM in two or more MBOMs. Allows the MBOM to separate engineering part numbers into separate manufacturing quantities to facilitate the manufacturing build sequence (Applicable to any two structures, not just EBOM and MBOM.)	CIMdata AD PLM AG – Multi-view BOM project team	
Standard Material	Item manufactured in conformance with an international or company standard, published and maintained by consensus and approved by a recognized body that provides, for common and repeated use, rules and characteristics.	CIMdata AD PLM AG – Multi-view BOM project team	

<b>Acronym or Term</b>	<b>Definition</b>	<b>Source of Definition</b>	<b>Synonym</b>
Standard Part	Expendable hardware item having relatively high usage, numerous applications and normally available from industrial supply outlets. Includes items such as nuts, bolts, screws, fasteners, rivets, resistors, capacitors, diodes, etc. Manufacturer Codes utilized with standard parts identify the industry or government agency controlling the design and assignment of part numbers.	ATA_SPEC-2000_2011-01	
State Change	Change status of an object (e.g., Drawing, Models, Bill of Material, etc.) in a lifecycle. For example, from work in progress to approved.	CIMdata AD PLM AG – Multi-view BOM project team	
Station	A sequential Physical or Virtual place for Manufacturing activities within a factory production area.	CIMdata AD PLM AG – Multi-view BOM project team	
Use Case	Description of a particular situation in which the system is used. Use cases form a part of the UML methodology (cf. EN 9300-004 section 5 and UML reference).	As per LOTAR	
Work Instruction	Printed or virtual document describing tasks, safety instruction, information delivered to manufacturing workers to perform parts manufacturing or assembly activities targeted in the MBOM.	CIMdata AD PLM AG – Multi-view BOM project team	

## About AD PLM Action Group

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The Aerospace and Defense PLM Action Group ([www.ad-pag.com](http://www.ad-pag.com)) is an association of aerospace OEMs and aircraft engine providers 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 (*including promoting, not duplicating, the work of standards bodies*)
- 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 prioritized industry and technology topics

CIMdata administers Group operations, coordinates research, and manages the progression of policy formulation.

## About CIMdata

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CIMdata, a leading independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM) solutions. Since its founding over thirty years ago, CIMdata has delivered world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM-enabling technologies.

CIMdata works with both industrial organizations and providers of technologies and services seeking competitive advantage in the global economy. CIMdata helps industrial organizations establish effective PLM strategies, assists in the identification of requirements and selection of PLM technologies, helps organizations optimize their operational structure and processes to implement solutions, and assists in the deployment of these solutions. For PLM solution providers, CIMdata helps define business and market strategies, delivers worldwide market information and analyses, provides education and support for internal sales and marketing teams, as well as overall support at all stages of business and product programs to make them optimally effective in their markets.

In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through PLM certification programs, seminars, and conferences worldwide. CIMdata serves clients around the world from offices in North America, Europe, and Asia-Pacific.

To learn more about CIMdata's services, visit our website at [www.CIMdata.com](http://www.CIMdata.com) or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495.533.666.