



LOTAR

LONG TERM ARCHIVING AND RETRIEVAL

Overview of the LOTAR project and LOTAR standards, Status of implementation in Europe

GIFAS, 29th of May 2012, Paris

Presented by Jean-Yves Delaunay : EADS Airbus

EADS SSC vice chairman

AIA - ASD Stan LOTAR co project leader

ASD SSG Vice Chairman

- Introduction – objective
- Overview of the LOTAR project
- Overview of the LOTAR standards
- Summary of implementation of LOTAR standards in Europe
- Overview of the Airbus project for Long Term Archiving and Retrieval of the A350 3D electrical harness installation
- Summary – next actions

- End of the 1990ies: different initiatives are launched in USA and in Europe for L-T Preservation of Aerospace and Defence Definition Dossier based on CAD 3D and PDM information
- 2005: convergence of the US PDES Inc - AIA LTDR project and of the ASD Stan - ProSTEP iViP LOTAR project, under the IAQG
 - IAQG: International Aerospace Quality Group
- 2008: creation of the LOTAR International project
- 2012: publication of the NAS9300 / EN9300 standards
 - : 2-ed2, 5, 7, 100, 110, 115, and sending for ballot of the part 120
 - : foundation for LT Preservation of CAD 3D PMI “graphic presentation”
- 2012-2015: preparation of the standards for L-T Preservation of:
 - CAD 3D PMI “semantic representation” and 3D light visualization,
 - CAD 3D composite design ,
 - PDM information (priority 1 : “As design” product structure),
 - CAD 3D Electrical harness

- To provide an overview of the LOTAR project
- To provide a status of the LOTAR standards
- To sum up the status of implementation of the LOTAR standards in Europe
- To recommend to the European A&D companies:
 - to **learn more about the LOTAR standards** and the associated COTS PLM solutions,
 - To **start to implement the LOTAR standards** for Long Term Preservation of CAD 3D with PMI information
 - according to their business requirements

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LOTAR

LONG TERM ARCHIVING AND RETRIEVAL



You are here: [Why LOTAR?](#) / Mission, Objectives & Scope

Tuesday, 2011-10-11

Home

Why LOTAR?

Mission, Objectives & Scope

Hosting Organizations

Legal & Business Motivation

Technical & IT Background

Goals & Benefits

LOTAR Organization

LOTAR Standard

News

Mission, Objectives & Scope

Mission

It is the mission of LOTAR International to develop global standard based archival and retrieval mechanisms for digital product and technical information. The project will achieve this through the ongoing harmonization and standardization efforts of Aerospace and Defense organizational affiliations. As part of the goals for archival and retrieval, the project will seek to enable data exchange and interoperability mechanisms to ensure long term use of digital product and technical information.

Objectives

The LOTAR International Project is a working group, supported by the AIA and PDES Inc. in the US and ASD-STAN and ProSTEP IVIP Association in Europe. These hosting Organizations and their responsibilities within the LOTAR project are described in detail below. The project goal is to develop, publish and maintain standards designed to provide the capability to archive and retrieve digital product and technical information, including 3D CAD and PDM data, in a standard neutral form that can be read and reused throughout the product lifecycle, independent of changes in the IT application environment originally used for creation. The multi-part standard covers both the information content and the processes required to ingest, store, administer, manage and access the information.

<http://www.lotar-international.org/>

LOTAR International project

A&D companies members in 2012



Members (Americas)

- BAE Systems
- Boeing
- Bombardier
- Embraer
- General Dynamics
- General Electric
- Goodrich
- Honeywell
- Lockheed Martin
- Sandia National Labs
- Spirit Aero

Potential Members (Americas)

- Cessna

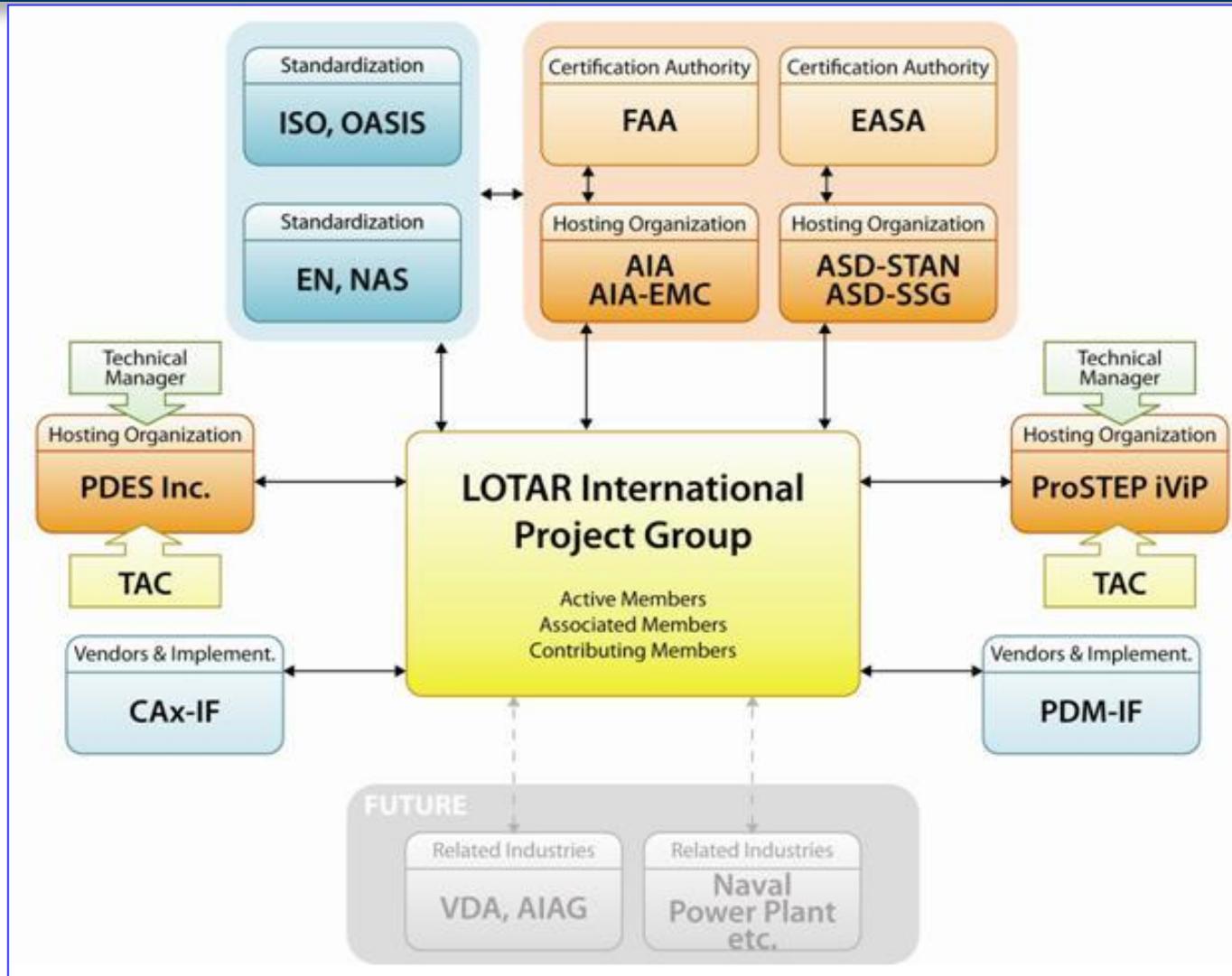
Members (Europe)

- *Airbus*
- *CASSIDIAN*
- *Dassault Aviation*
- *Eurocopter*
- *IAI (Israel Aerospace Industries)*
- *SAFRAN Labinal*

Potential Members (Europe)

- *AWE (Atomic Weapons Establishment)*
New member depending on start of
Electric Harness activity

LOTAR International project and external relationships



MoU between AIA and ASD Stan for LOTAR: Same standards developed jointly by the US and European A&D manufacturers



MEMORANDUM OF UNDERSTANDING

Between

AeroSpace and Defense Industries Association of Europe –Standardization (ASD-STAN)

and

Aerospace Industries Association of America, Inc. (AIA)

In order to promote a common understanding, approach and standard for **LOTAR** *Long Term Archiving and Retrieval of digital product data* in the Aerospace Industries of Europe and the United States and to make optimal use of the resources available:

OBJECTIVE:

This Memorandum of Understanding (MOU) between ASD-STAN and AIA is intended to set the parameters on the following:

- First, for joint publication at the regional level (Europe and Americas) of harmonized standards EN9300 (by ASD-STAN) and NAS9300 (by AIA).
- Second, recognition of the harmonized standards at the international level as a single document through ISO (*International Organization for Standardization*) TC 20 (*Aircraft and space vehicles*).

Joint publication at the regional level (Europe and Americas) of harmonized standards EN9300 (by ASD-STAN) and NAS9300 (by AIA).

Target: Recognition of the harmonized standards at the international level as a single document through ISO (*International Organization for Standardization*) TC 20 (*Aircraft and space vehicles*).

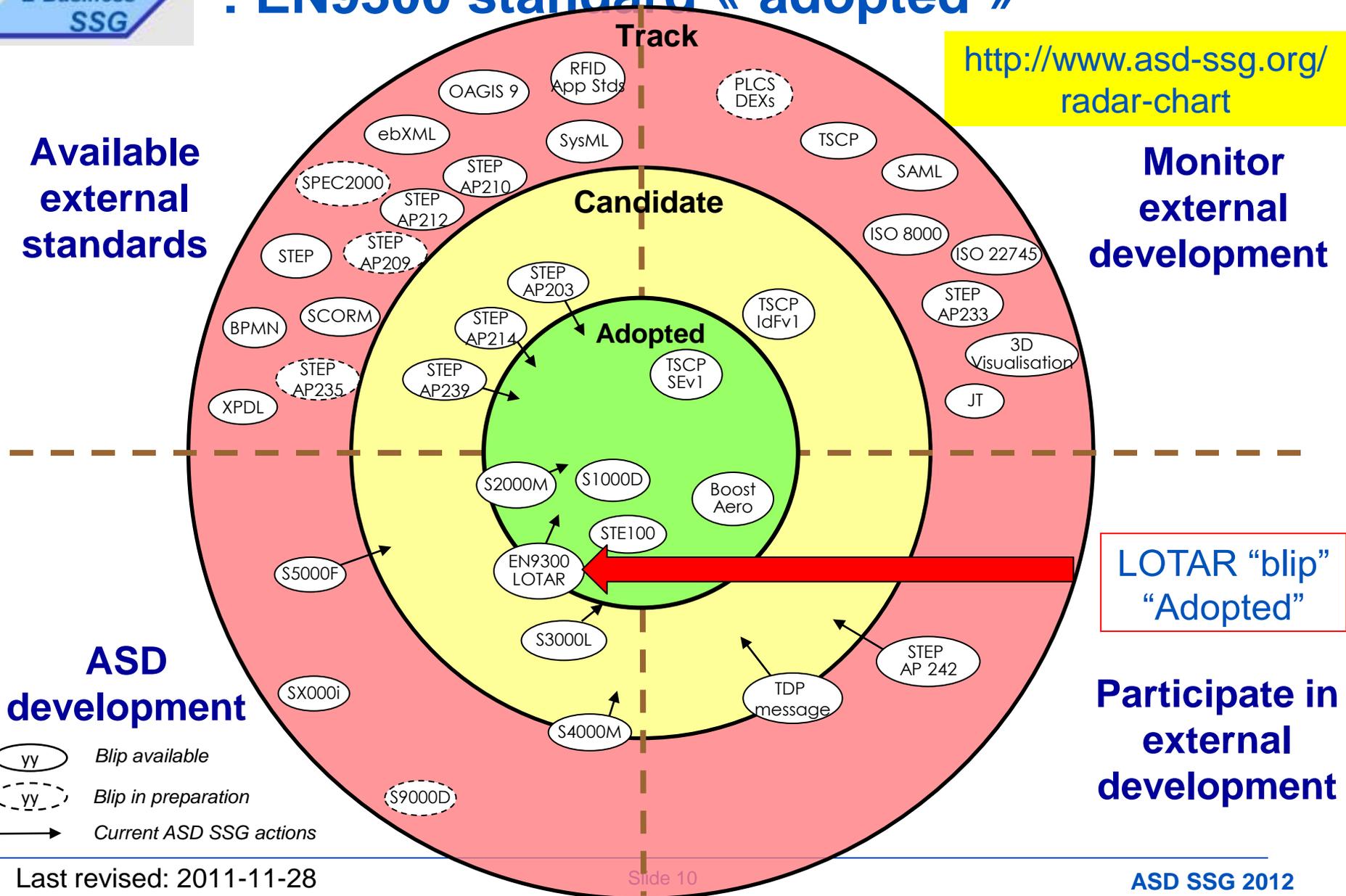
2011 status of the SSG « Radar screen » : EN9300 standard « adopted »

E-Business
SSG

<http://www.asd-ssg.org/radar-chart>

Available external standards

Monitor external development



LOTAR "blip"
"Adopted"

Participate in external development

Long-Term Archiving and Retrieval of 3D digital aerospace product information, such as CAD and PDM (LOTAR)

Abstract

The LOTAR project is designed to provide a capability to preserve digital aerospace and defense product information in a standard neutral form that can be read and reused throughout its lifecycle, independent of changes in the IT application environment originally used to create it.

ASD adoption statement

The multi-ASD recommends the use of EN9300 LOTAR standards by the European aerospace and defense industries for projects for LT Archiving and Retrieval of CAD 3D geometry and processes. The LOTAR CAD assembly structure, with effect from March 2010.

LOTAR, supported by the AIA, under

ASD recommendation

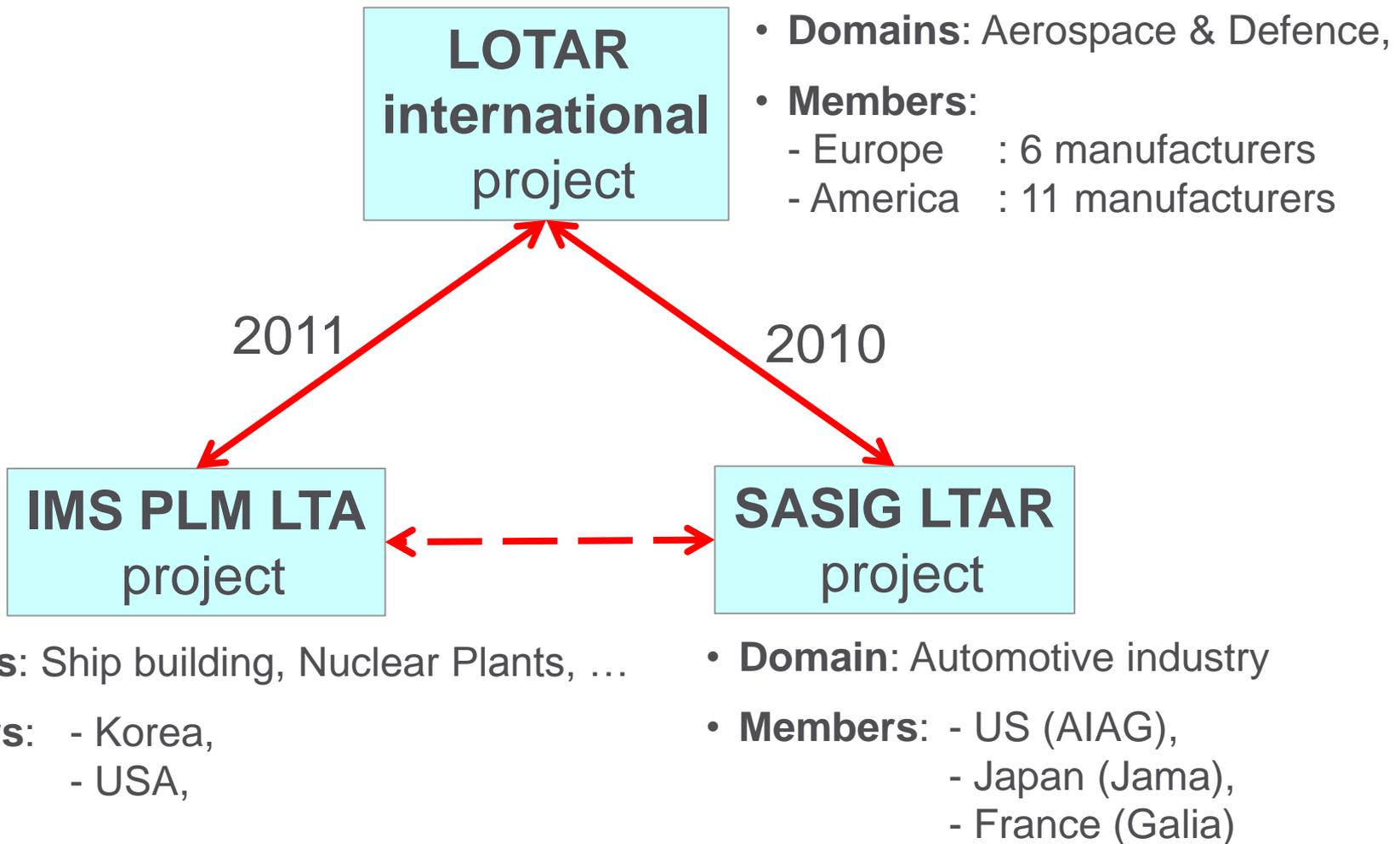
The SSG recommends European aerospace and defence OEM to participate in the LOTAR international project, in order to speed up the development of the different parts according to their business priorities.

Responsible Steering Board
Lead Organisation
ASD Standard
ASD SSG
ASD LOTAR

Link to a standards host site

<http://www.lotar-international.org/>

Cooperation between LOTAR A&D project and other PLM LTA projects (Started in 2010)



Regular meetings since 2006 between the ASD Stan LOTAR project and EASA



June 2006



Next ASD Stan LOTAR – EASA meeting planned in Q4 2012

Long Term Archiving and Retrieval of Digital Product Data

Presentation of the ASD Stan LOTAR project on the 1st of June 2006

ASD-STAN 2006



October 2006



Long Term Archiving and Retrieval of Digital Product Data

2nd meeting of the ASD Stan LOTAR project on the 12th of October 2006

ASD-STAN 2006



March 2009



Long Term Archiving and Retrieval of Digital Technical Product Data

3rd meeting of the ASD Stan LOTAR project with EASA on the 12th of March 2009



WP0:
Project Management

WP1:
Development
of **Basic Parts**

WP2:
Development
of **Common
Process Parts**

WP3:
Development
of **Data Domain
Specific Parts**

WP4:
Implementation of
Pilot Projects

WP5:
Development of
**L-T Archiving
Rec. Practices**

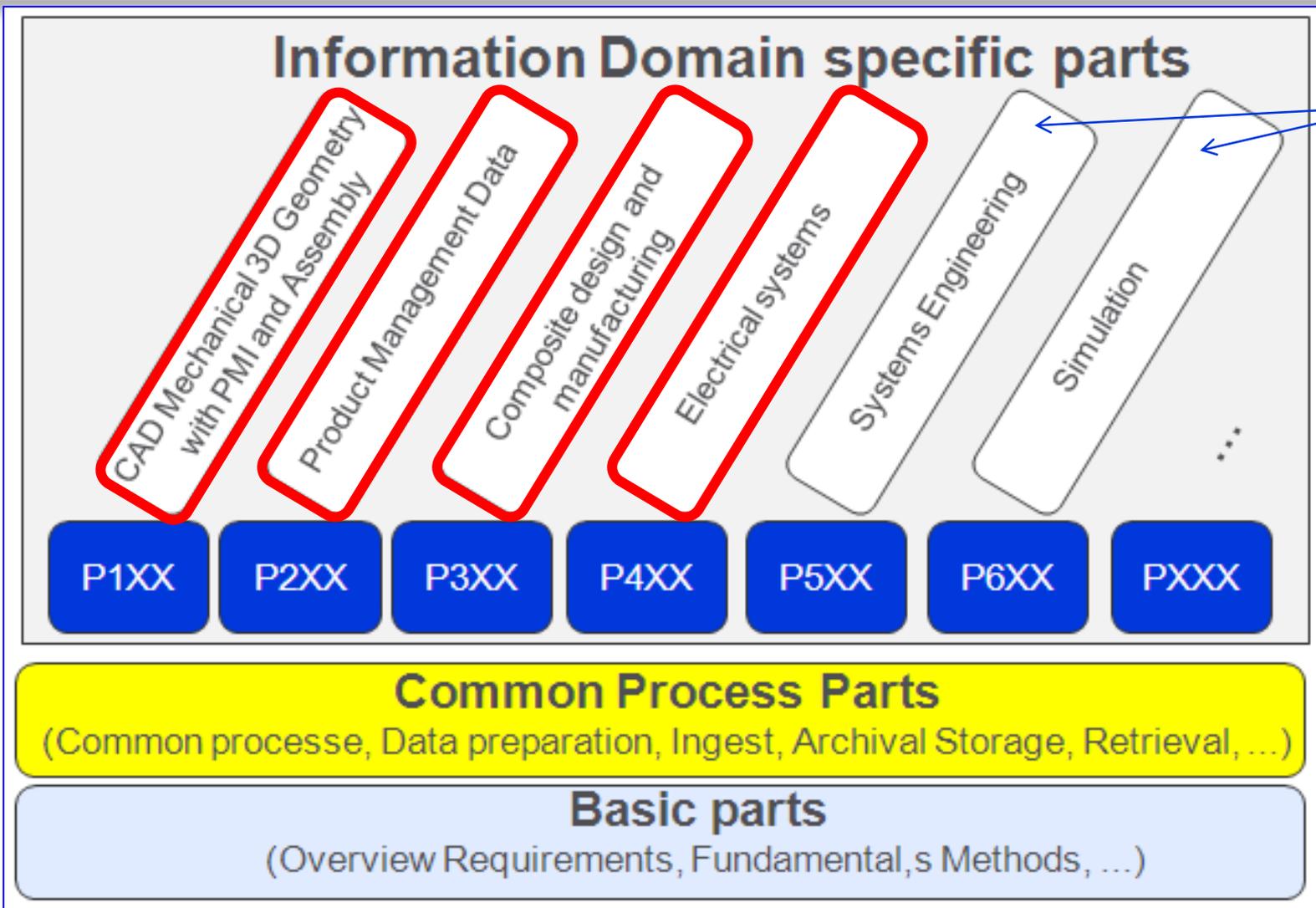
WP6:
Harmonization
(AIA EMC, AIA EEIC,
ASD SSG, ASD Stan,
PDES Inc,
ProSTEP iViP,
ISO /TC 184 /SC4,
CAX Impl. Forum, ...)

WP7:
Communication
(FAA, EASA, ...
IT Vendors,
Standardization)

Overview of NAS / EN 9300 LOTAR standards



An architecture for extensions according to business needs

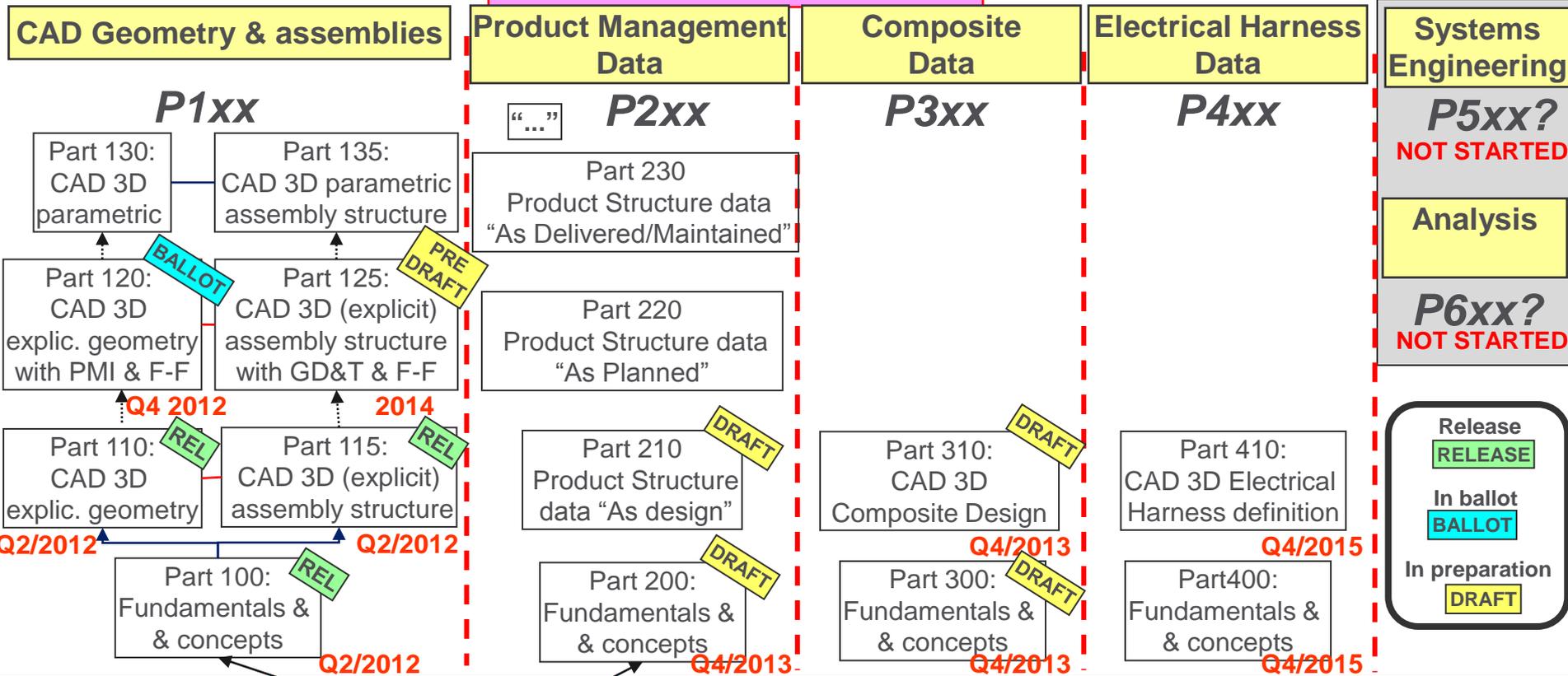


Not started

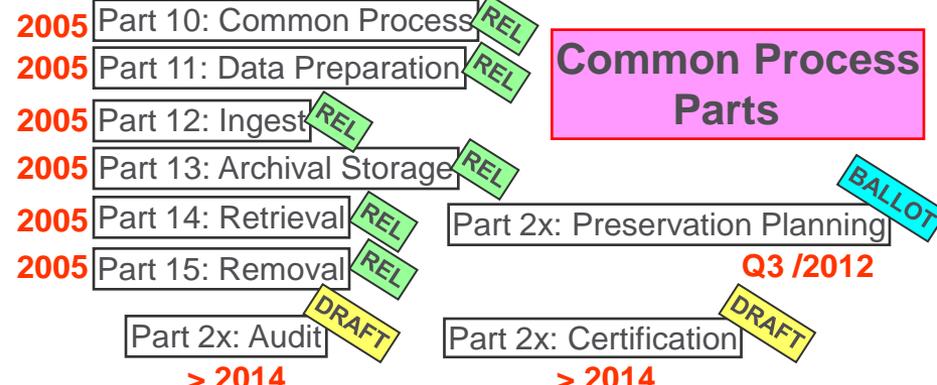
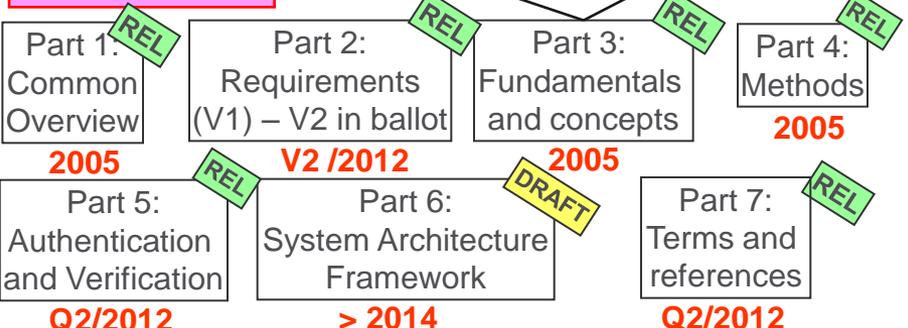
NAS / EN 9300 LOTAR standards overviews



Data Domain Specific Parts

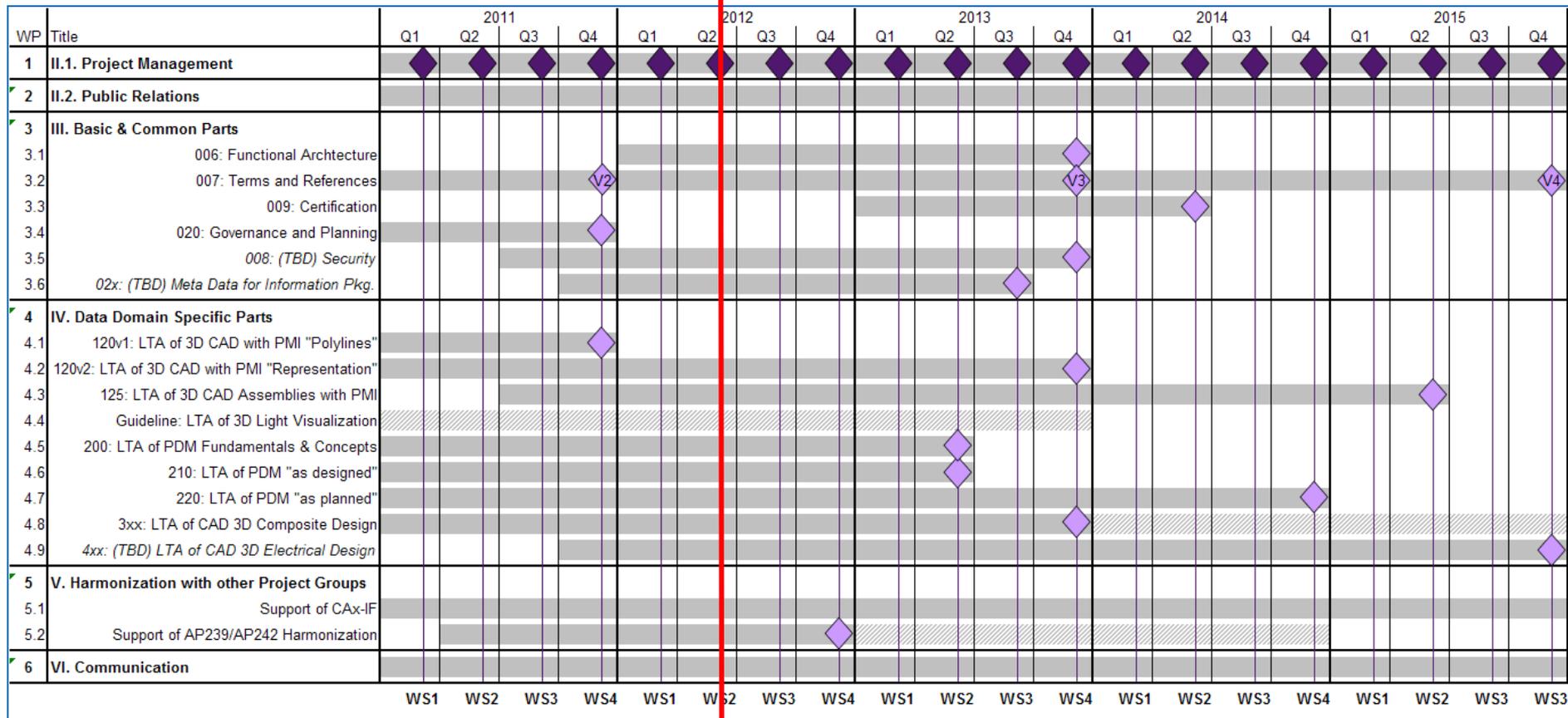


Basic Parts



Common Process Parts

LOTAR Five Year Plan



Next AIA – ASD Stan LOTAR workshop
26th – 28th of June 2012 (Toulouse – Cimpa)

Active participation of A&D manufacturers, and coordination with standardization associations

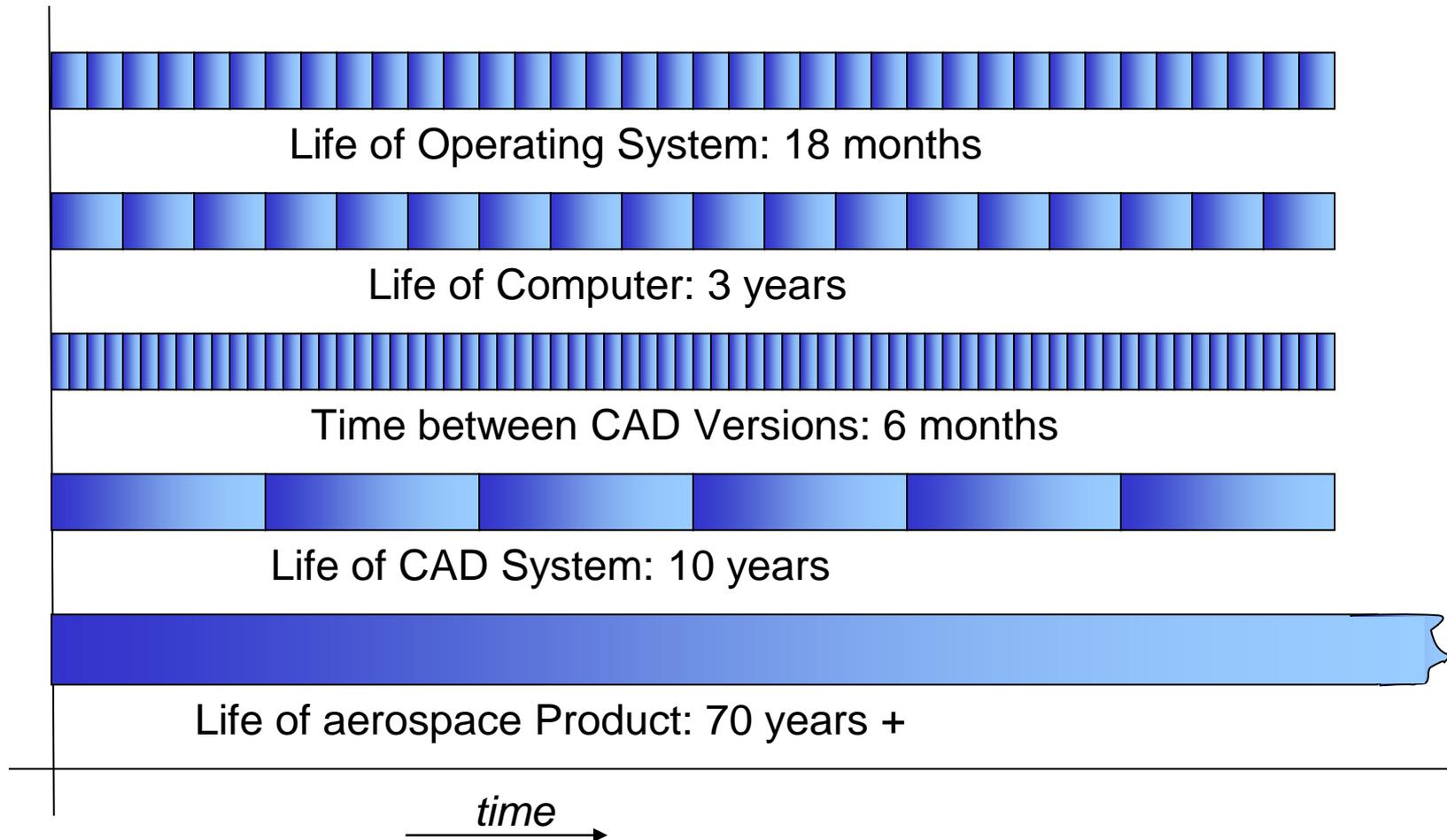
- **4 international LOTAR workshops of 3 days:**
 - 19th – 21st of March 2012 USA, NIST (parallel to the PDES Offsite)
 - 26th – 28th of June 2012 Europe, Toulouse, Cimpa 
 - 17th – 19th of Sept. 2012 USA, PDES Inc (parallel to the PDES Offsite)
 - 4th – 6th of Dec 2012 Europe, Darmstadt, ProSTEP iViP

- **Weekly teleconferences of the main Working Groups:**
 - PDM WG, CAD 3D PMI WG, CAD 3D composite WG
 - Coordination team
- Bi weekly teleconferences:
 - Electrical Harness WG, Meta data for Archive Package WG

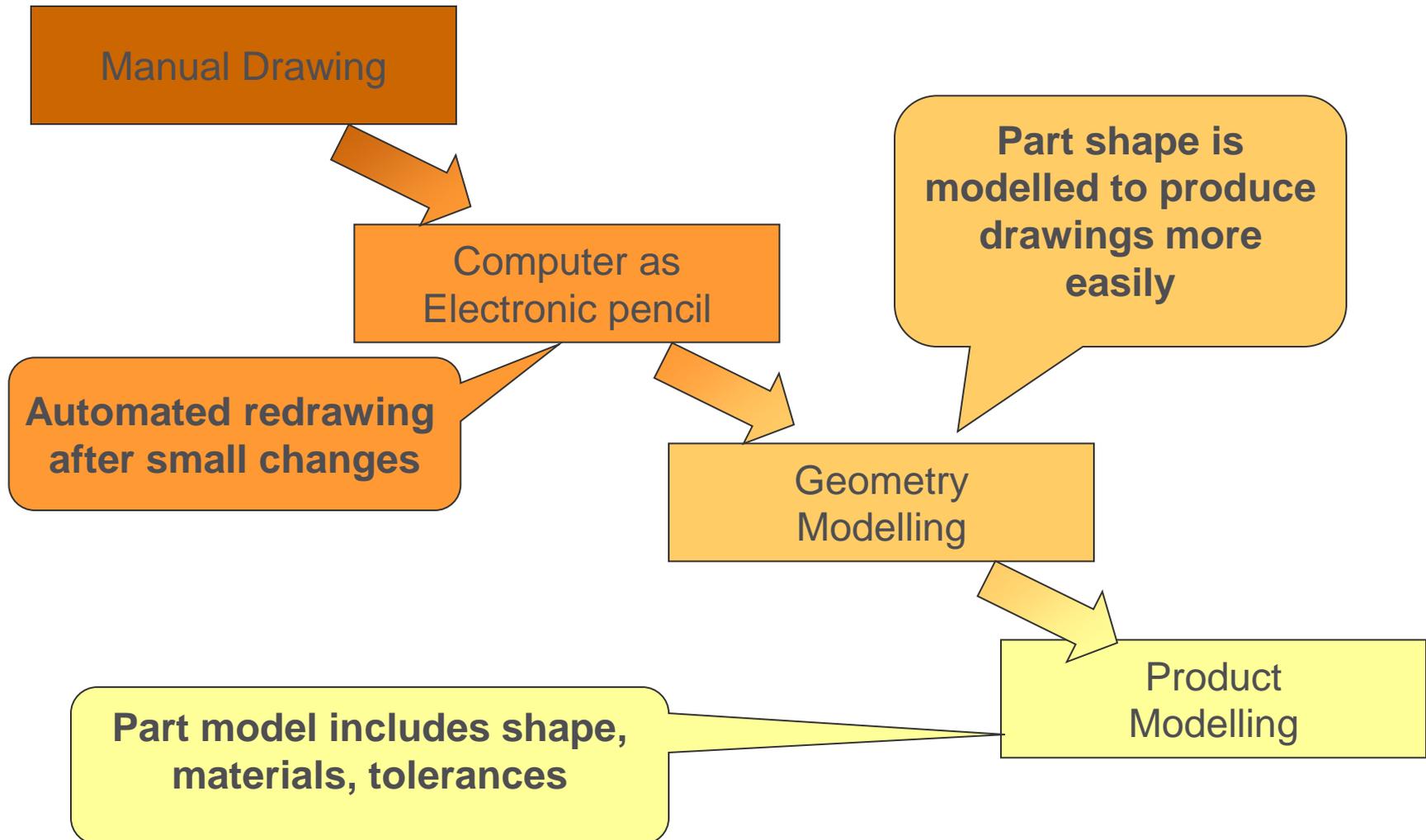
- **Coordination with A&D and PLM standardization associations**
 - Aerospace and Defence manufacturers associations: AIA and ASD
 - PLM Standardization associations: PDES Inc and ProSTEP iViP

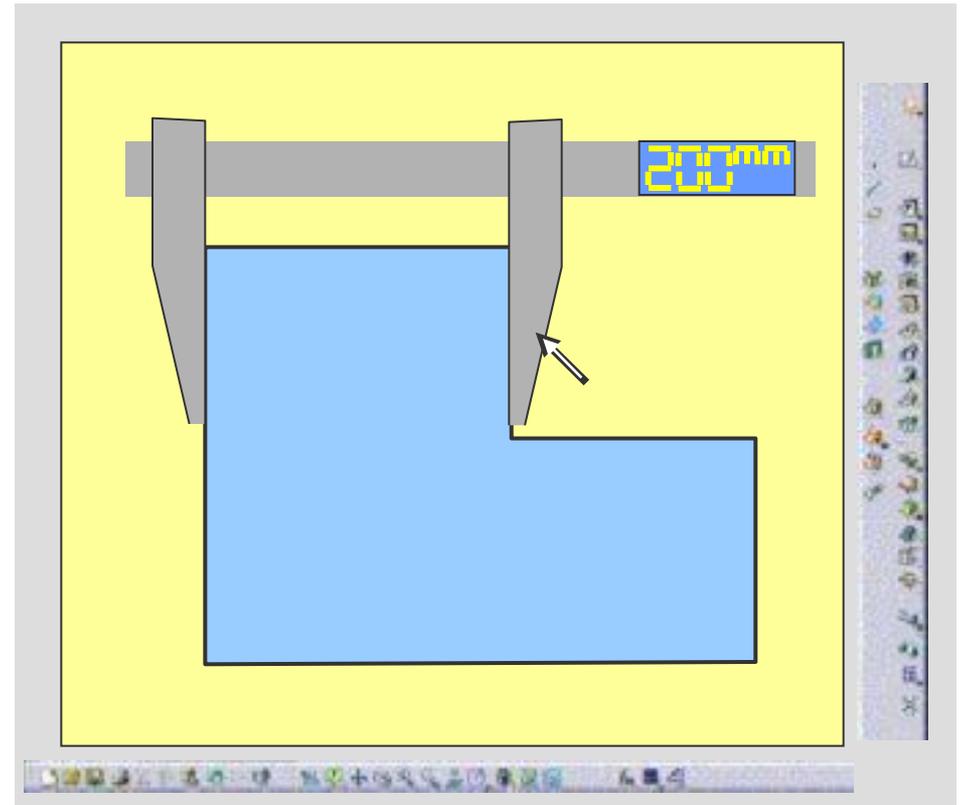
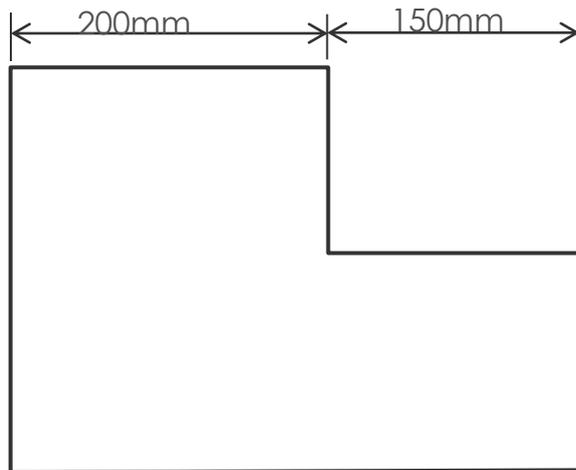
- Introduction – objective
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Rates of Change of technologies versus the longevity of an aerospace product



A Brief History of CAD





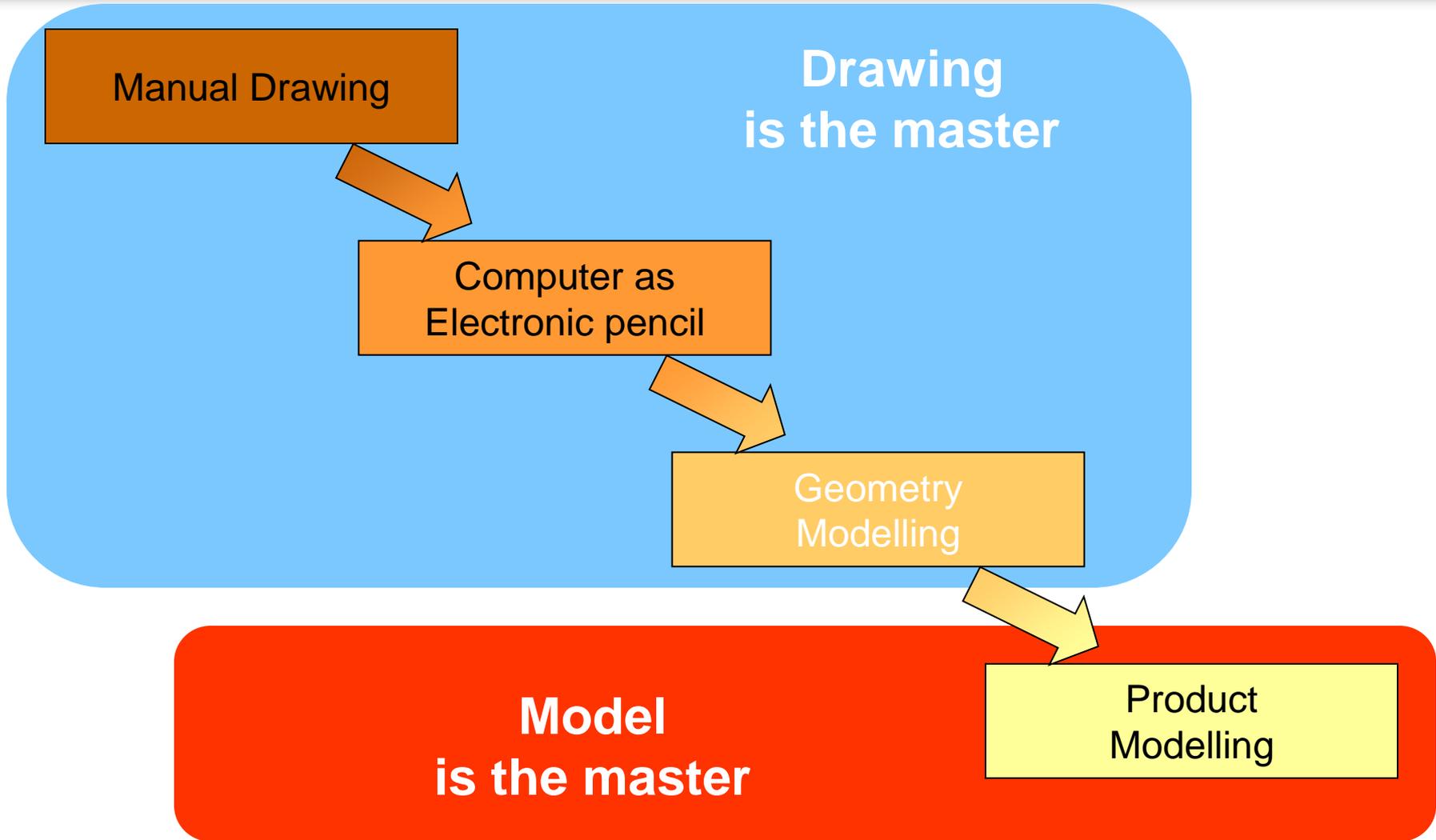
Drawings -

Models -

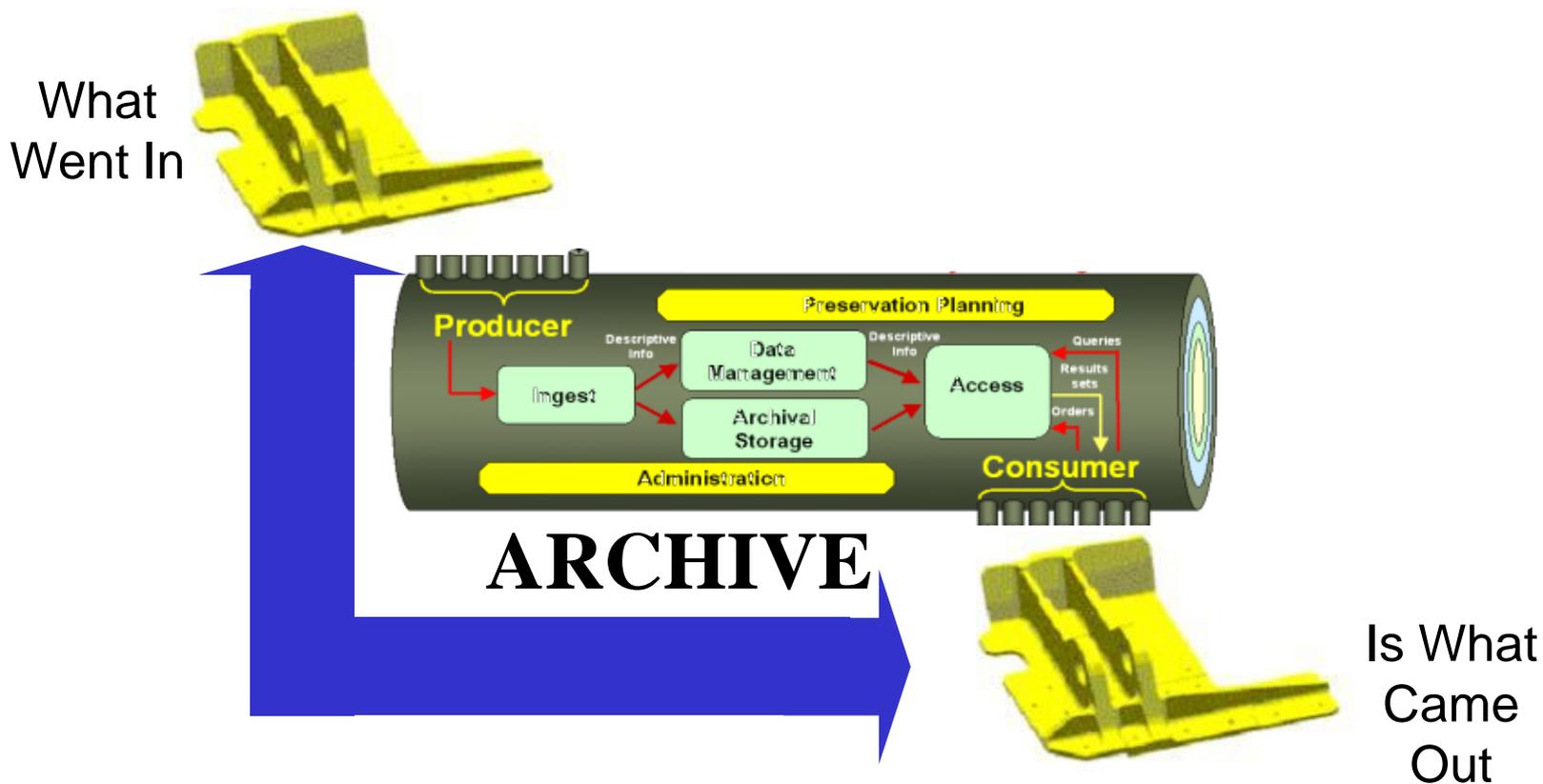
Dimensions define a drawing

Dimensions are read from a 3D model

What is the master?

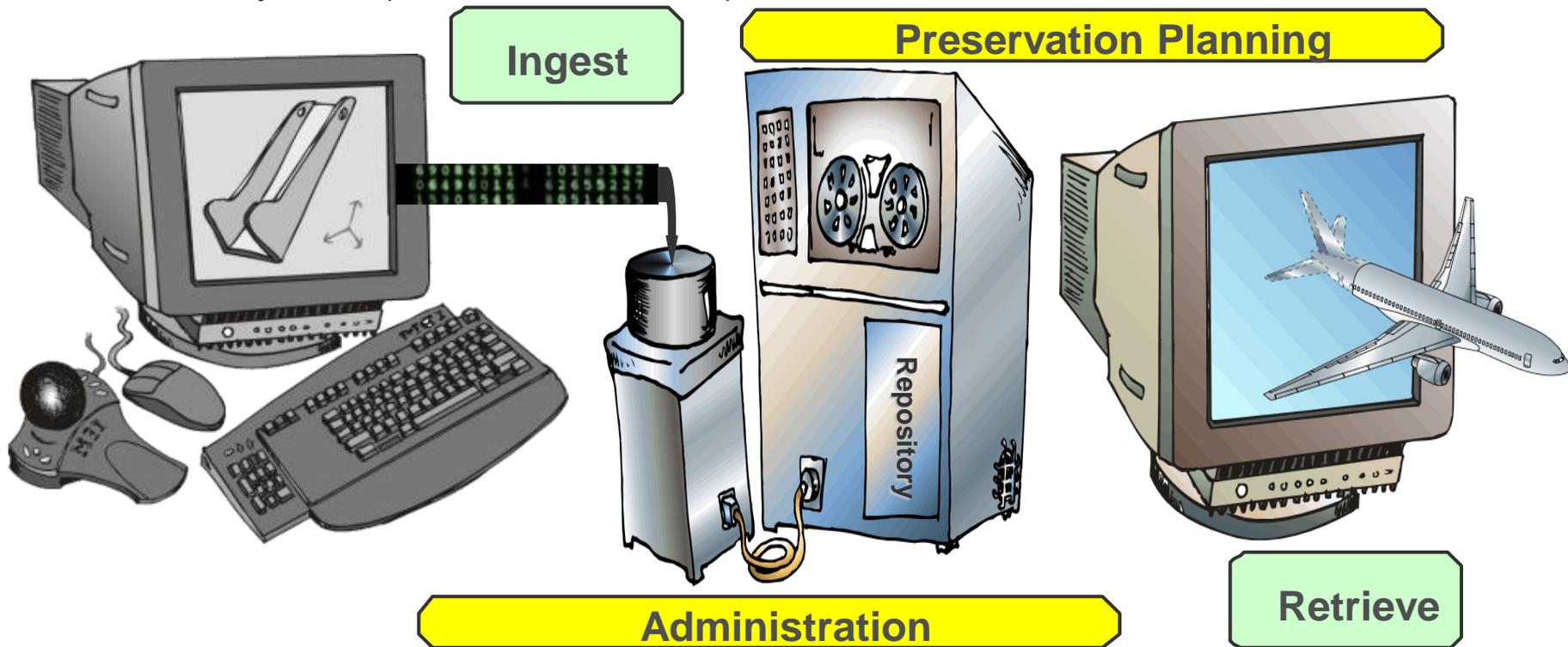


For model as master, we need to prove we have retained the master



The LOTAR project: To support the longevity of Aerospace & Defense 3 D Model based definition

- CAD S/W versions change every **6 to 12 months**, CAD generations change every **10 years**.
- Aircraft lifecycle of **70+ years**
- The Lifecycle of software & hardware is short compared to the lifecycle of an aircraft or a defence system (nuclear missile, ...)



Status of NAS/EN 9300

Basic Parts



001: Common Overview

- Objective, structures of the EN9300 parts

Publi.
Q2 2012

002: Requirements

- Business Requirements (Acceptance, legal, security, certification)
- Functional Requirements based on the OAIS reference model

Publi.
Q2 2012

003: Fundamentals and concepts

- Product model, OAIS ISO, ISO Open product data standards (STEP), representation - presentation, validation / verification, key characteristics



004: Methods (description)

- Scope/ scenario, Use Case diagram, process, data, system architecture

Publi.
Q2 2012

005: Authentication and Verification

- Electronic Keys, Electronic signature, Hash Code, Authentication, Verification, electronic time signatures



006: Architecture Framework (new)

- Identification of sub-systems with associated functions

Publi.
Q2 2012

007 Terms and References (new)

- Common to all parts of EN9300 (updated with new parts)

Status of NAS/EN 9300

Common Process Parts

 **010: Overview Data Flow**

 **011: Data Preparation**

 **012: Ingest**

 **013: Archival Storage**

 **014: Retrieval**

 **015: Removal**

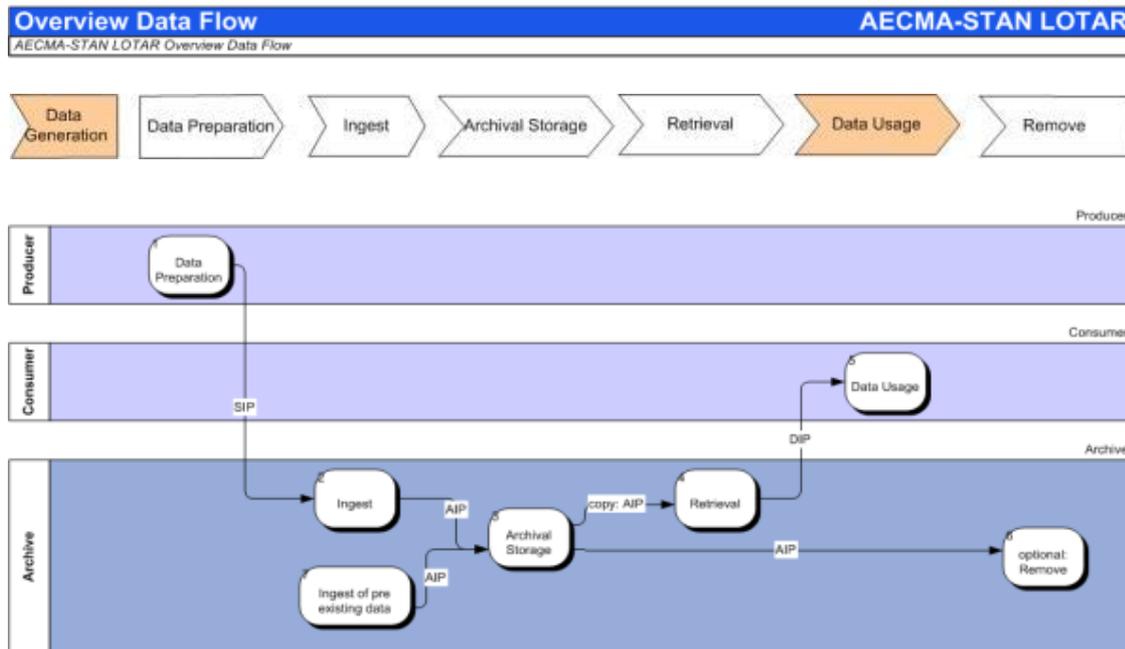
 **016: Test Suites**

 **020: Governance and planning**

Ballot
S2 2012

 **02X: Audit (of the LT Archiving and retrieval system) > 2014**

 **02X: Security (of the LT Archiving and retrieval system) > 2014**



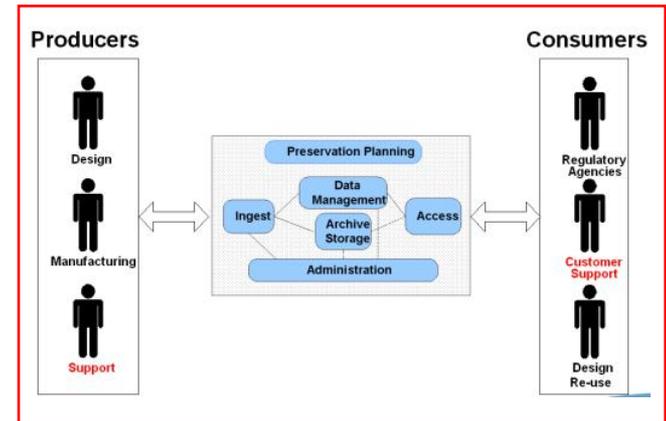
LOTAR business requirements part 2 edition 2

BUSINESS REQUIREMENTS

- 6.2.1 ACCEPTANCE
- 6.2.2 LEGAL REQUIREMENT
- 6.2.3 SECURITY REQUIREMENT
- 6.2.4 CERTIFICATION

FUNCTIONAL REQUIREMENTS based on the OAIS reference model

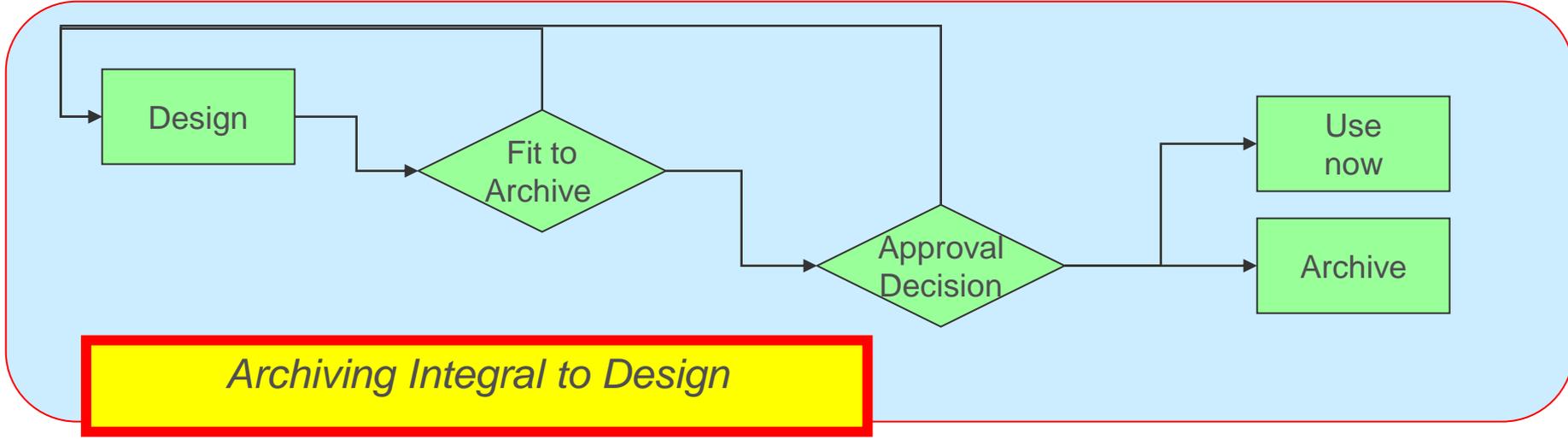
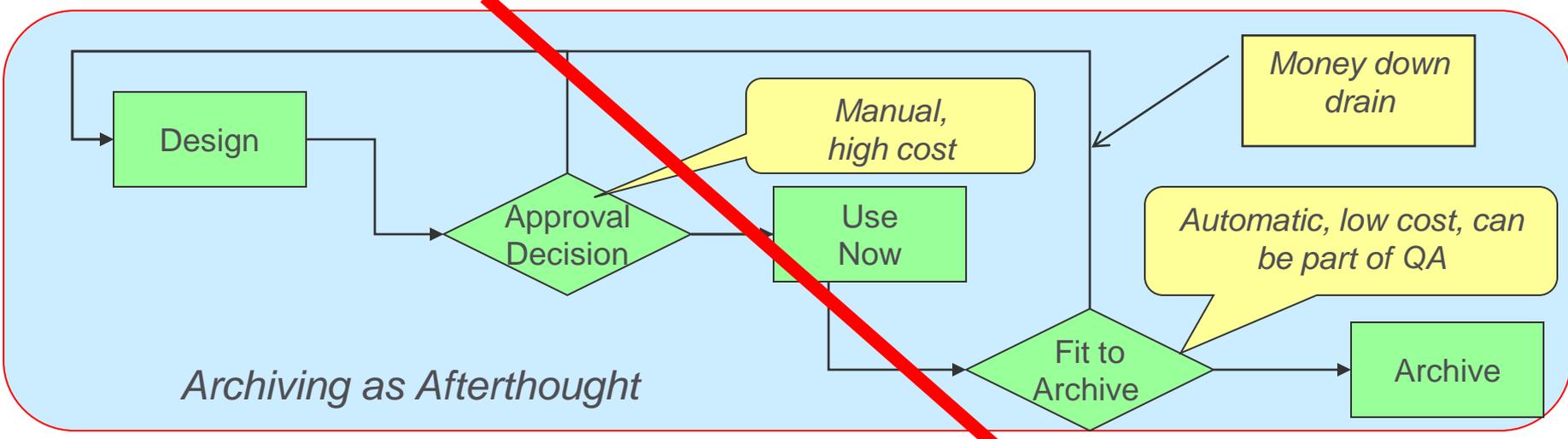
- Preparation 9
- Ingesting Product Definition into Repository/Archive 5
- Archive Storage 11
- Disaster Recovery: 4
- Data Management: 42
- Administration 5
- Preservation Planning: 15
- Access 8



SPECIFIC REQUIREMENTS per TYPES OF 3D CAD-PDM DATA to preserve

- REQUIREMENTS for LT Preservation of **3D PARTS** (3D EXACT SOLID BOUNDARY REP.)
- “ “ LT Preservation of **EXPLICIT CAD ASSEMBLY STRUCTURE**
- “ “ LT Preservation of **PDM cDMU** INFORMATION OF THE A380
- “ “ LT Preservation of **CAD 3D EXPLICIT GEOMETRY WITH GD&T**

Long Term Archiving is not an Afterthought => Long Term Preservation is integral to Design



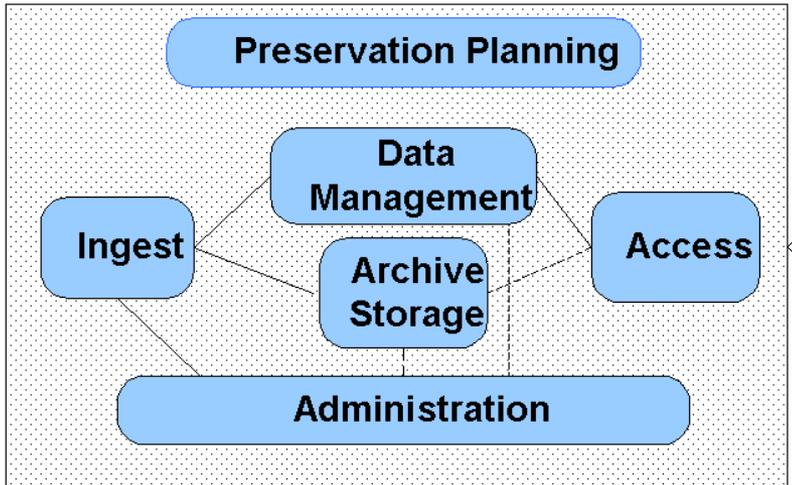
NAS/EN 9300 Fundamentals and concepts N°1 : Use of ISO OAIS (Open Archive Information Model)



Producers

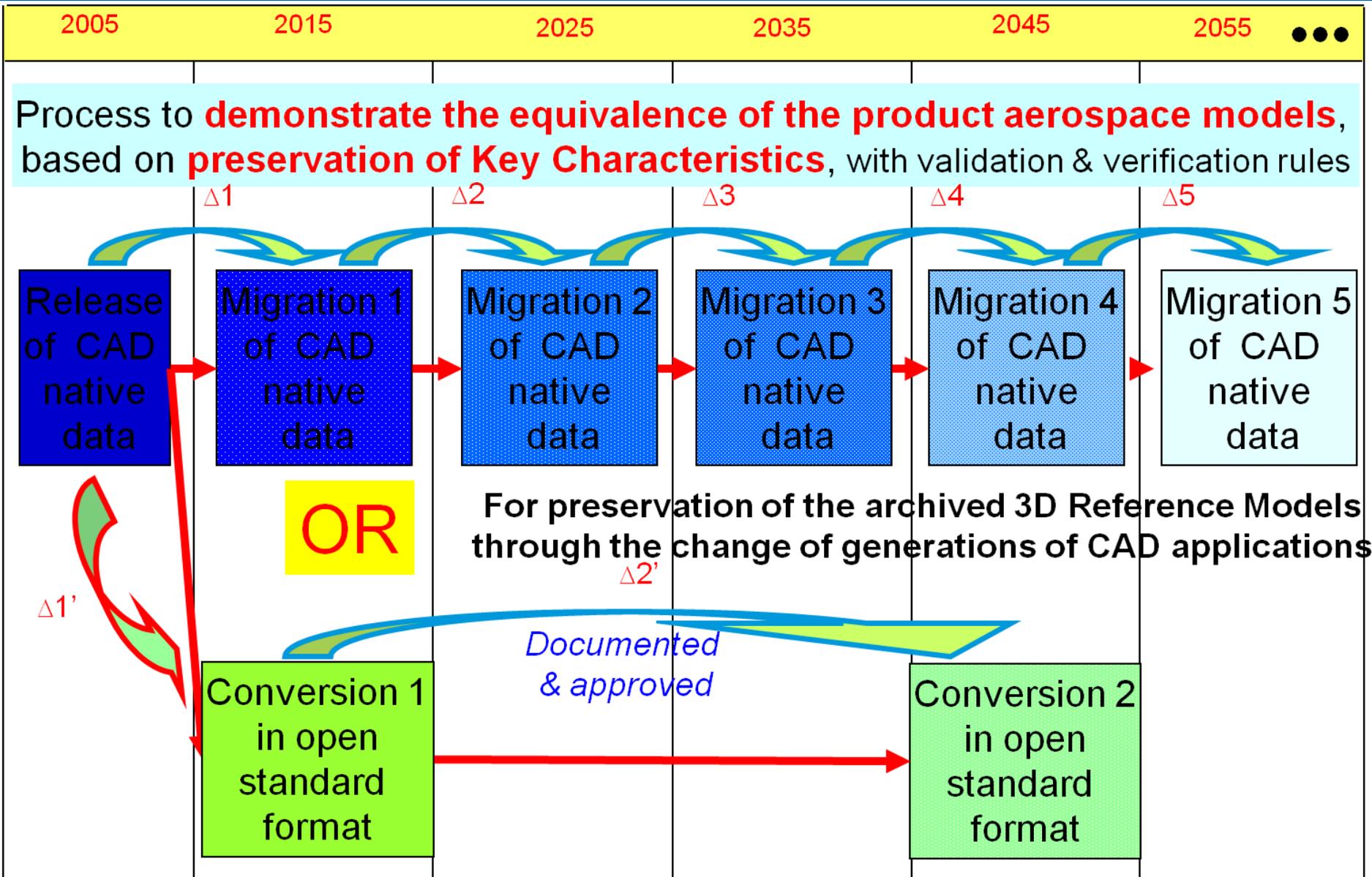


Consumers



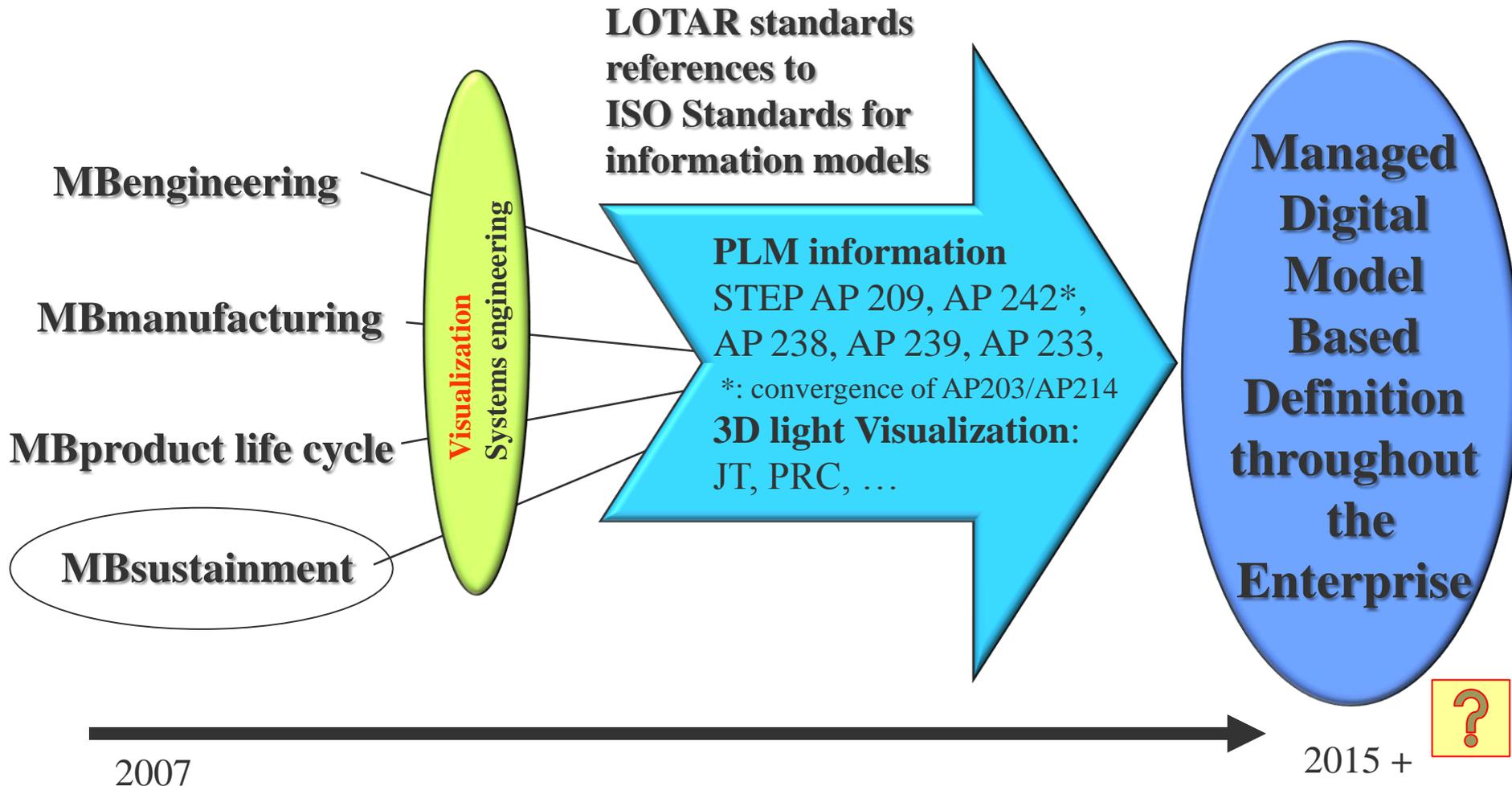
NAS/EN 9300 Fundamentals and concepts N°2

: L.-T. Preservation based on open standards



NAS/EN 9300 Fundamentals and concepts N°2

: Use of the suite of ISO STEP standards and related 3D light visualization standards



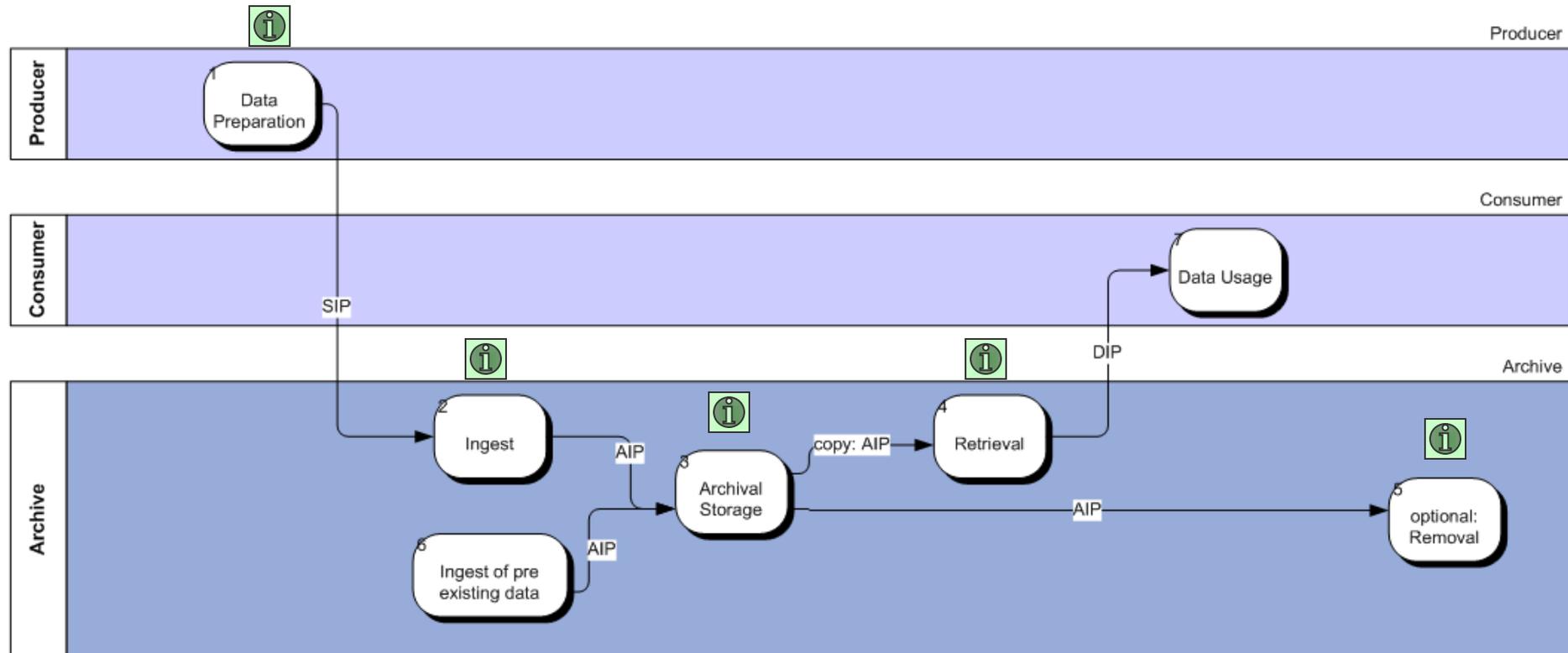
NAS/EN 9300 Process parts

PART 010: Overview Data Flow

Overview Data Flow

AECMA-STAN LOTAR

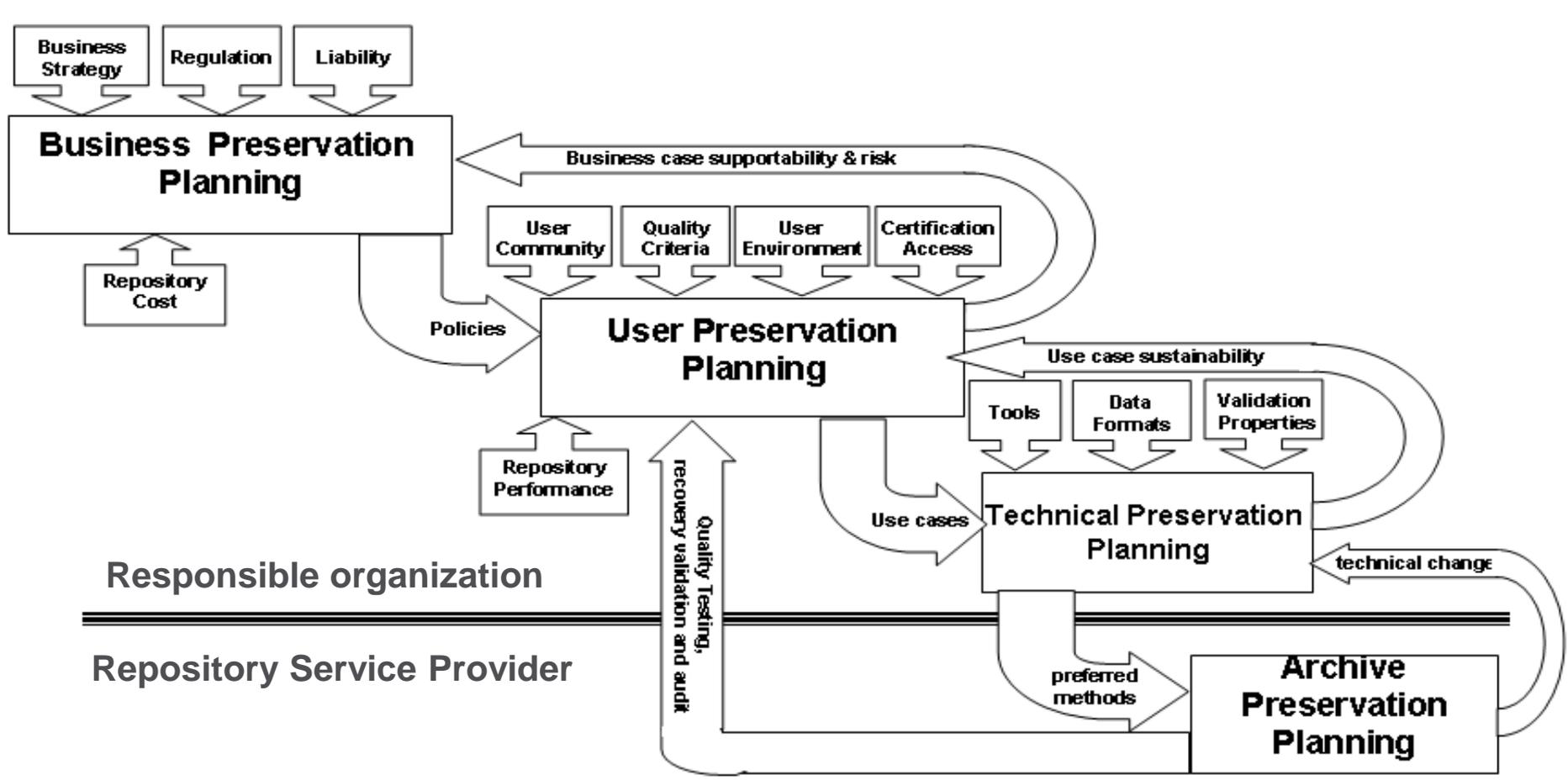
AECMA-STAN LOTAR Overview Data Flow



1	Introduction
2	Scope
3	Normative references
4	Terms, definitions and abbreviations
5	Applicability
6	Responsibility Model
7	Business Preservation Planning
8	User Preservation Planning
9	Technical Preservation Planning
10	Knowledge Management
11	Risk Management
12	Organizational Compliance with LOTAR
13	Repository Responsibilities
Appendix A	Relationship between OAIS and LOTAR
Appendix B	Organization Structure

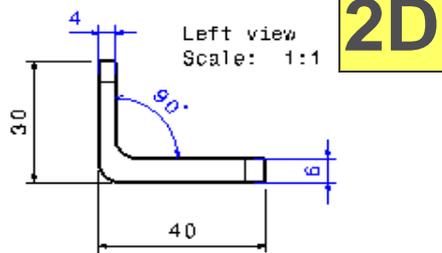
Table of content

- 4 levels of preservation planning: **business** level, **user** level (E.g, design office), **technical** level (E.g, Information system organization), + **archive system level**

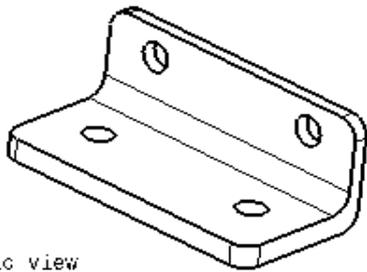


PART 100: Common concepts for Long term archiving and retrieval of CAD 3D mechanical information

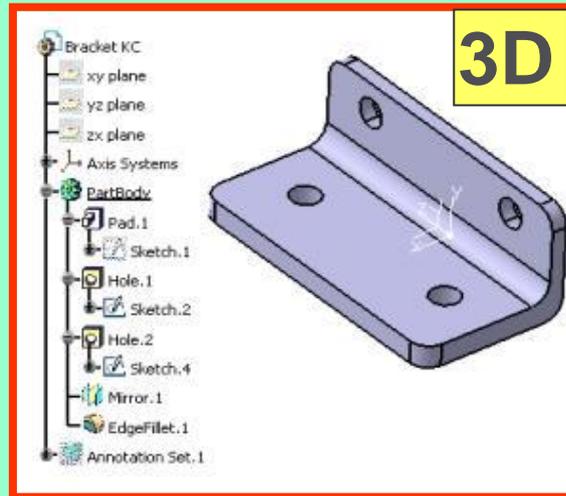
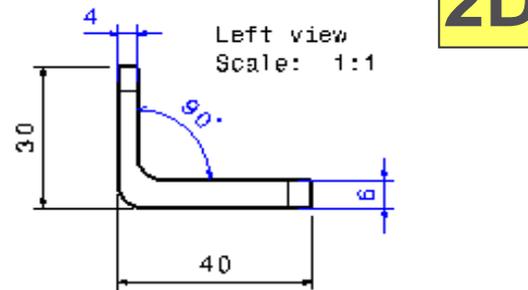
Method **Generation 1** (2D drawing only)



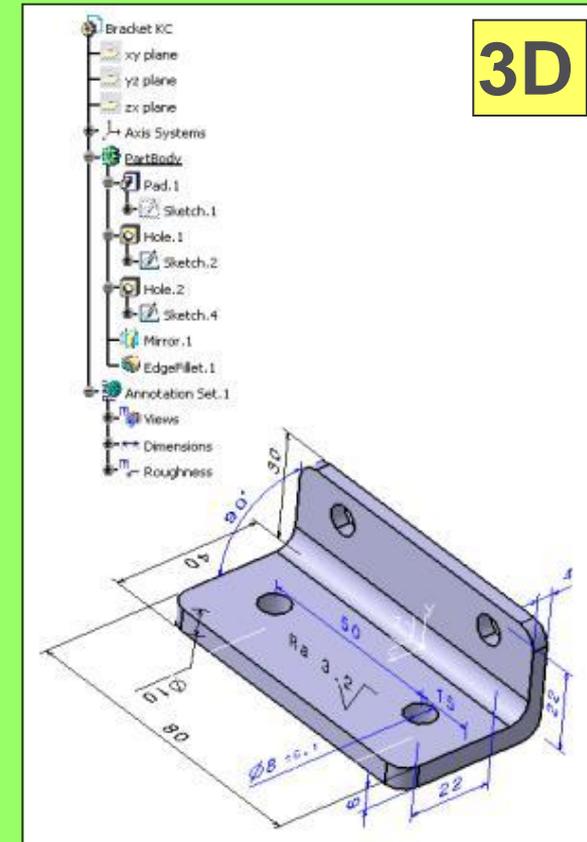
Isometric view
Scale: 1:1



Method **Generation 2** (2D & 3D)



Method **Generation 3** (3D with GD&T as master)



Overview of the NAS/ EN9300-100

Illustration of different CAD data functionalities for mechanical design, and the related generation

CAD generation technology break	1980	1985	1990	1995	2000	2005	2010	2015	2020	2025	2030
3D surfaces											
3D Explicit Solid											
3D Explicit Solid Geometry with GD&T (Geometric Dimensions & Tolerances)											
3D Explicit Solid Geometry with GD&T & machining Form Features											
3D parametric Geometry with Construction History											

+ Dimensions & Tolerances

Hole
General pocket
General_outside_profile

Capability to update the part using construction history / parametric

PART 100: Common concepts for Long term archiving and retrieval of CAD 3D mechanical information

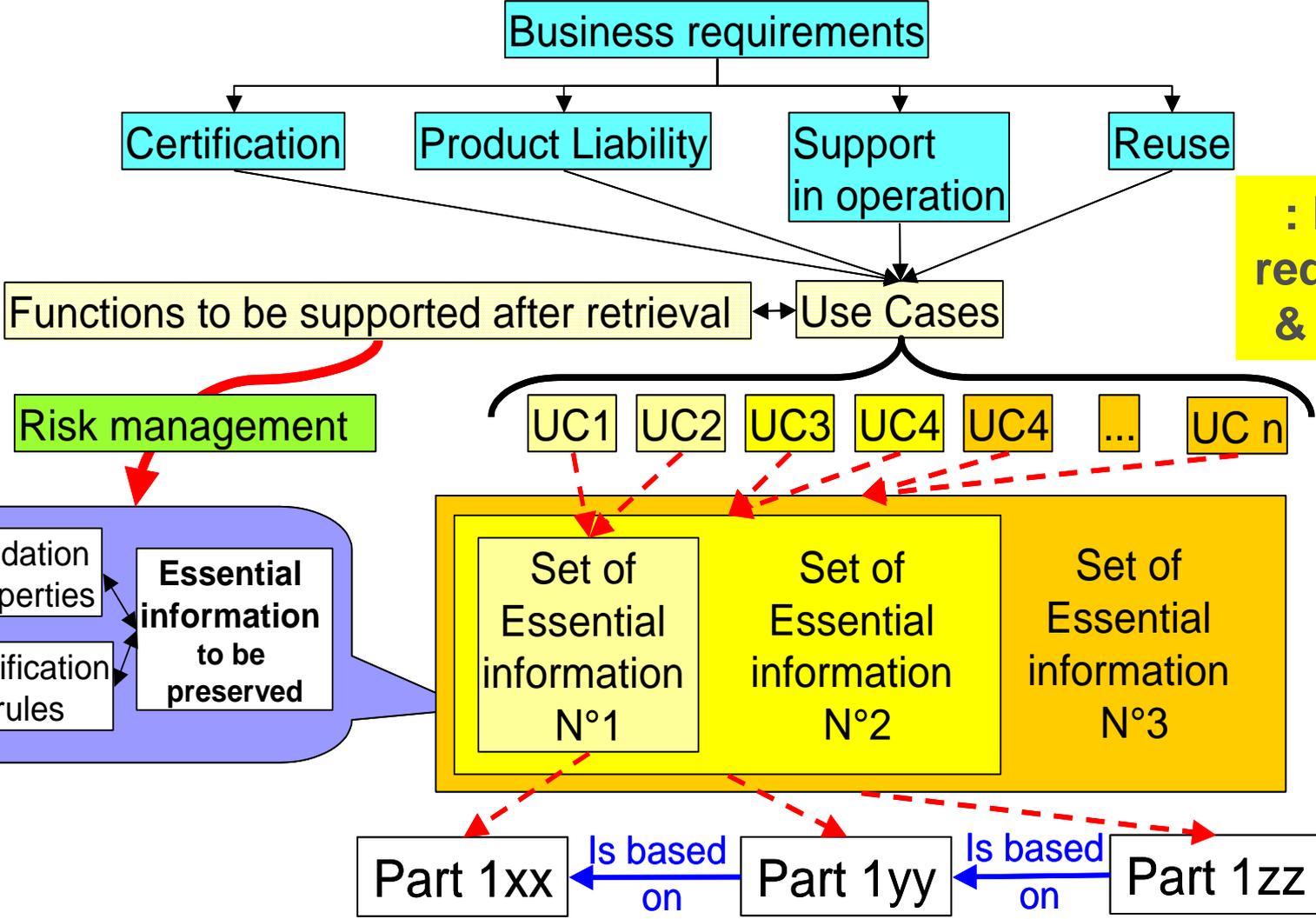
Document structure of EN9300-1XX family

9300-100	Common concepts for LT Archiving of CAD 3D mechanical information
9300-110	Long Term Archiving of CAD 3D Explicit Geometry
9300-115	Long Term Archiving of CAD Explicit Assembly Structure
9300-120	Long Term Archiving of CAD 3D Explicit Geometry with 3D Product and Manufacturing Information (PMI)
9300-125	Long Term Archiving of CAD Explicit Assembly Structure with 3D Product and Manufacturing Information (PMI)
9300-130	Long Term Archiving of CAD 3D parametric geometry
9300-135	Long Term Archiving of CAD parametric Assembly Structure

Template for the table of contents of a part of the family EN9300-1xx.

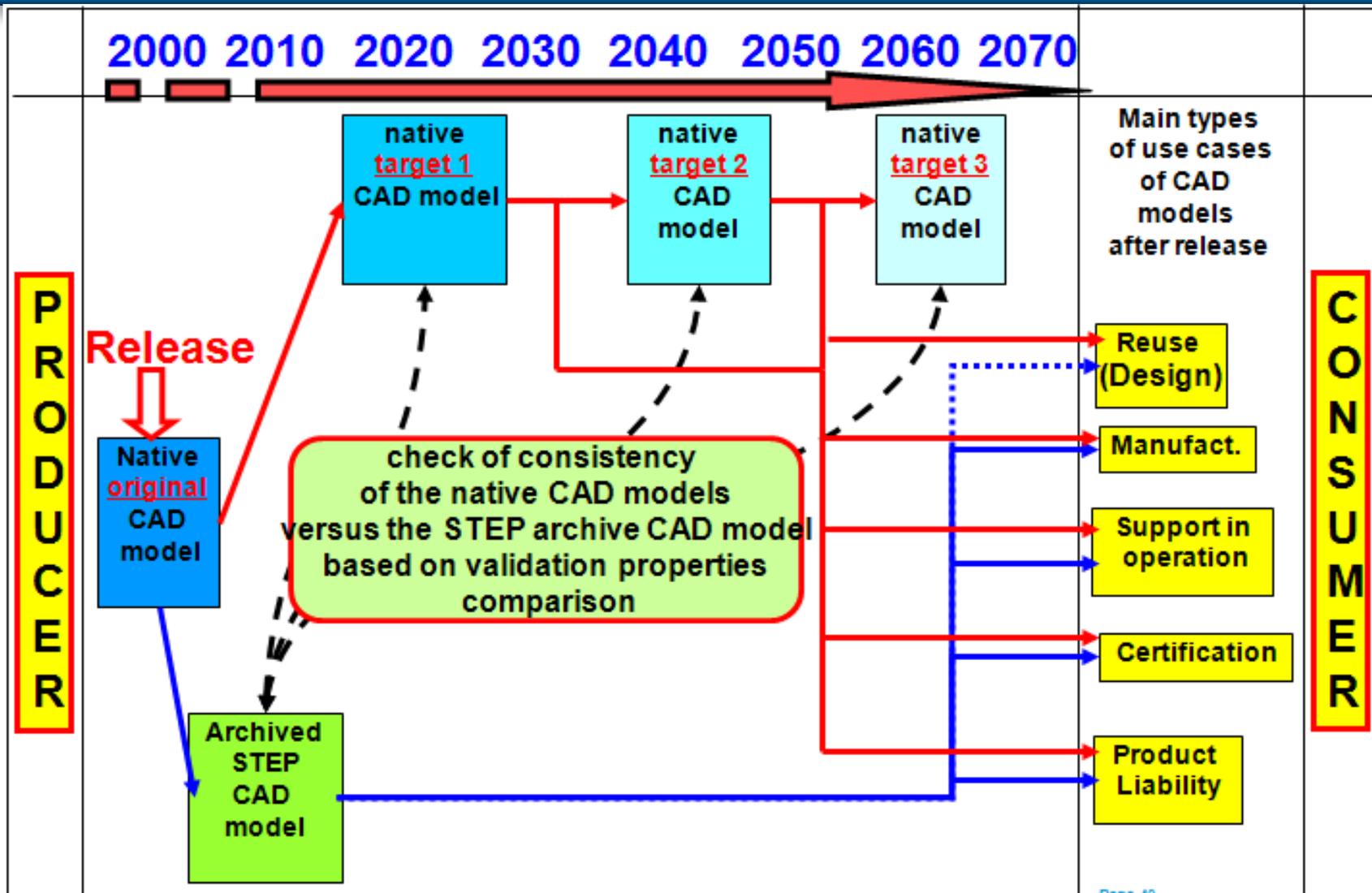
- 1 - Scope
- 2 - Normative references
- 3 - Terms, definitions and abbreviations
- 4 - Applicability
- 5 - Fundamental concepts (if requested)
- 5 - Business specifications
- 6 - Essential information
- 7 - Definition of the core model
- 8 - Verification rules
- 9 - Validation rules

PART 100: Common concepts for Long term archiving and retrieval of CAD 3D mechanical information



: Business requirements & use cases

PART 100: Common concepts for Long term archiving and retrieval of CAD 3D mechanical information



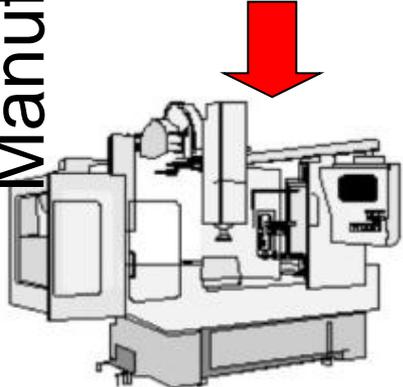
PART 100: Common concepts for Long term archiving and retrieval of CAD 3D mechanical information

Manufacturing



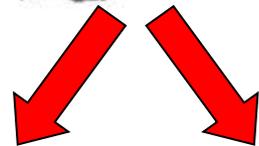
Design
"Definition Dossier"

Definition of Key Characteristics of the part, with tolerances



Manufacturing

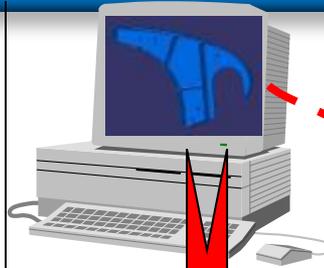
Control based on predefined Key Characteristic (with tolerances)



Physical Part N°1

Physical Part N°2

The 2 parts are different to some minor geometry shapes, but are in the tolerance for its Key Characteristics

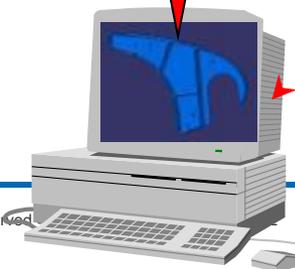


LT Archiving 2000

3D Geometric Model for LT preservation

Long Term Archiving System

3D Geometric Model



3D Geometric essential information is preserved, with the associated tolerance

Information semantic integrity is controlled, based on definition of essential information, and tolerances

For Support in operation, Product Liability, Certification

2030

■ Scope: The archiving of 3D Explicit geometry

Out of scope:

- Implicit or parametric geometry (planned in part 130)
- Drawing
- Annotation (see part 120)
- Assembly structures. (see part 115)

■ Use cases

- Documentation of Aerospace & Defense product design for regulatory and contractual compliance
- Aerospace & Defense Industry incident investigation
- Design re-use – product modification
- Product lifecycle & supply chain support and disposal.

■ Essential information: The 3D exact shape

■ Core model: ISO 10303-514 (Advanced boundary representation)
used by **STEP AP203 and AP 214**

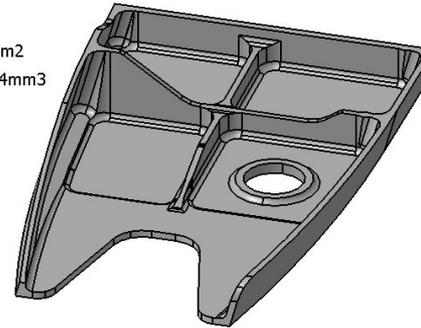
■ Validation :

- Validation properties level 1 : Volume, centroid and area

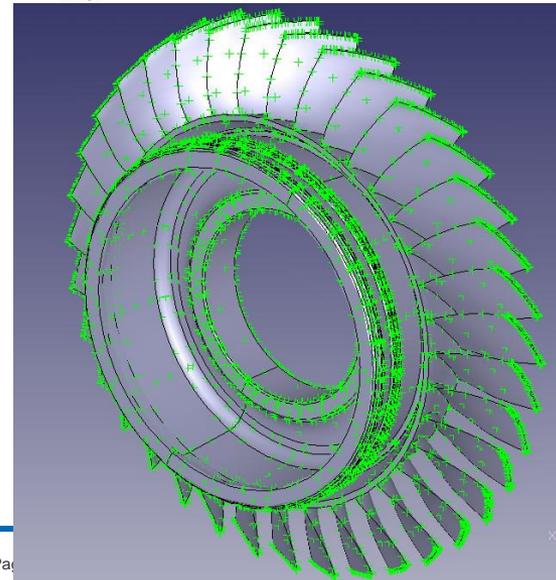
Gx=115.498mm
Gy=-0.902mm
Gz=8.353mm



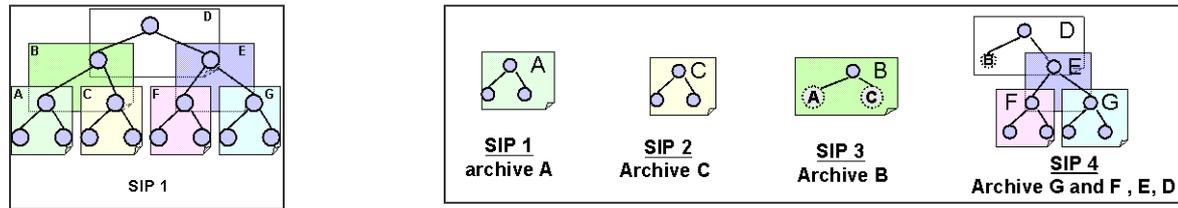
Area=156872.419mm²
Volume=344714.254mm³



- Validation properties level 2:
Optional: Clouds Of Points



- **Scope:** CAD assembly structure
Out of scope: geometric model (see part110)
- **Essential information:** Nodes + basic attributes + relationship
- **Use cases:** full archiving & incremental archiving



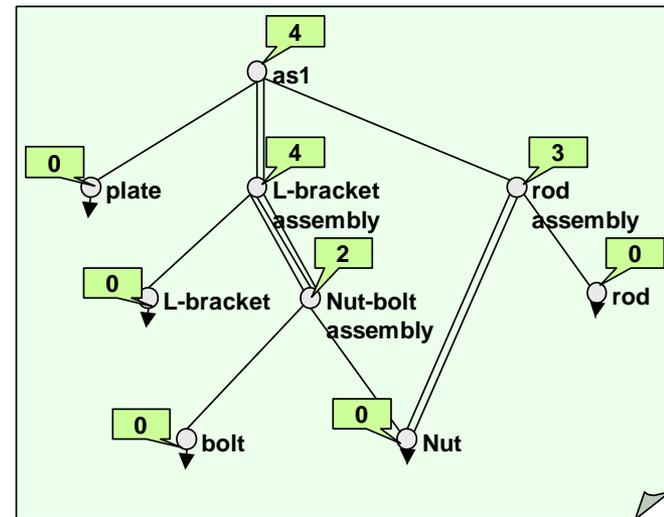
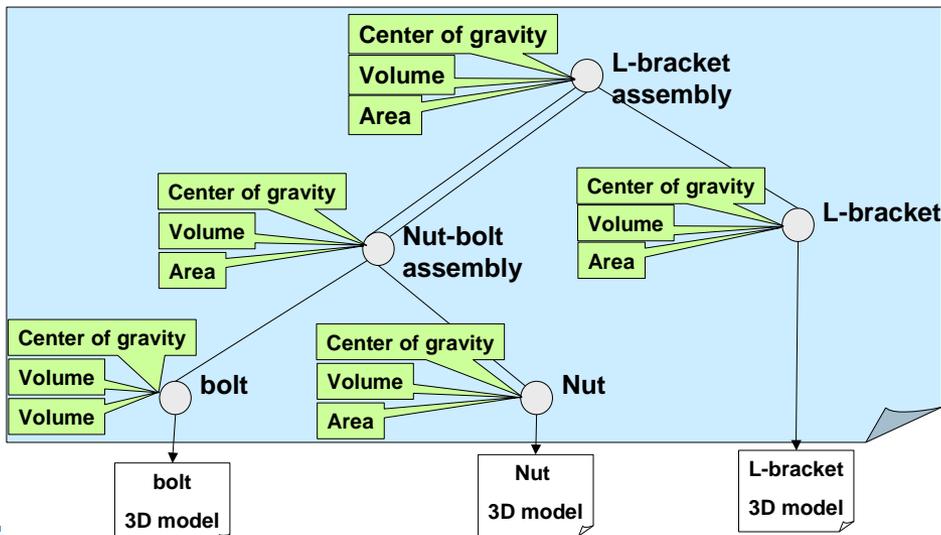
- **Core model** (ISO 10303 STEP AP 203 and AP 214):
 - Based on the PDM schema and the associated usage guide
 - CAX-IF recommended practices

■ Verification

- Some simple rules like no acyclic assembly structure

■ Validation:

- Geometric validation properties: volume, centroid and area
- Assembly validation properties



- **Scope** : the archiving of the 3D geometry with PMI 3D annotations, 3D Geometric Dimensions & Tolerances (GD&T), 3D symbols, 3D Users Defined Attributes

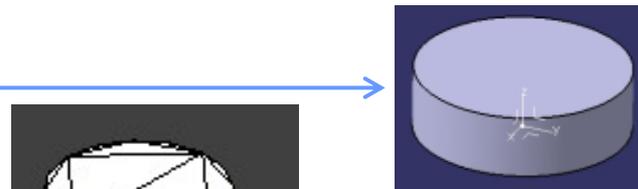
- **Planning**
 - Phased approach see next slides
 - version 1: Preservation of the presentation (“graphic presentation”)
 - version 2: Preservation of the representation (“semantic”)

- **Status** (P120 version 1): to be launched for ballot in Q3 2012
 - Recommended practice of STEP AP 203 ./ 214 available
 - Implementation pilots

Main categories of CAD information of a Definition Dossier based on 3D with PMI

Illustration of the main types of information of 3D PMI:

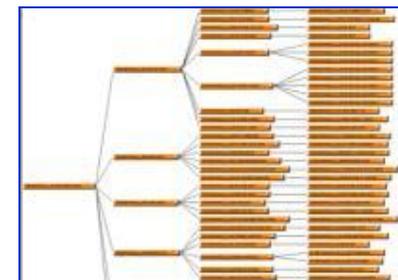
3D exact shape



3D simplified – facettized (“context”)



Assembly structure and associated meta data



3D dimensioning & tolerancing (GD&T)



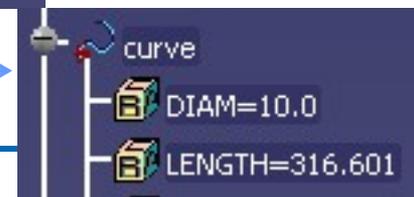
3D annotations



3D symbols (E.g. welding, fasteners, ...)



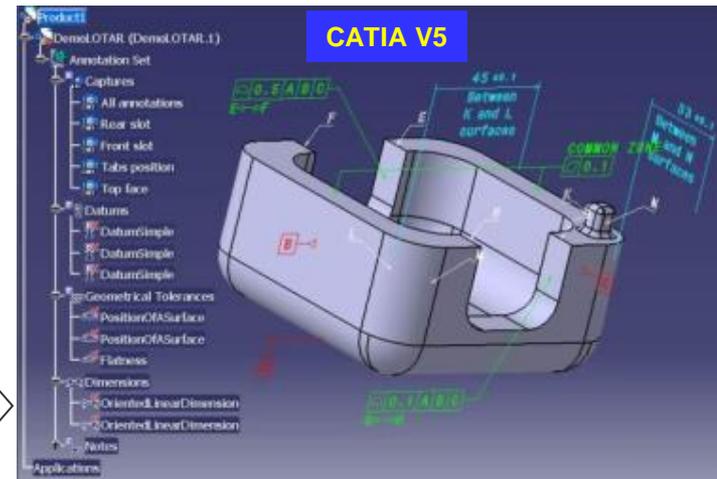
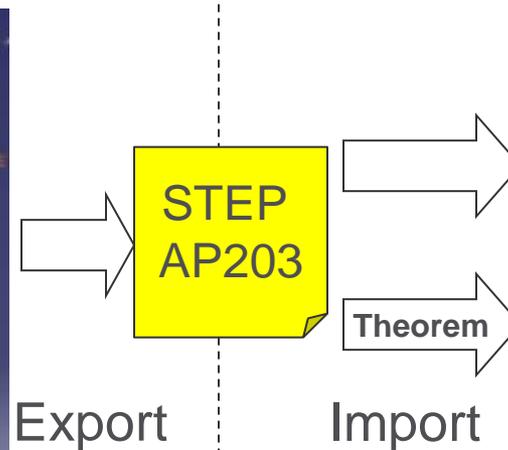
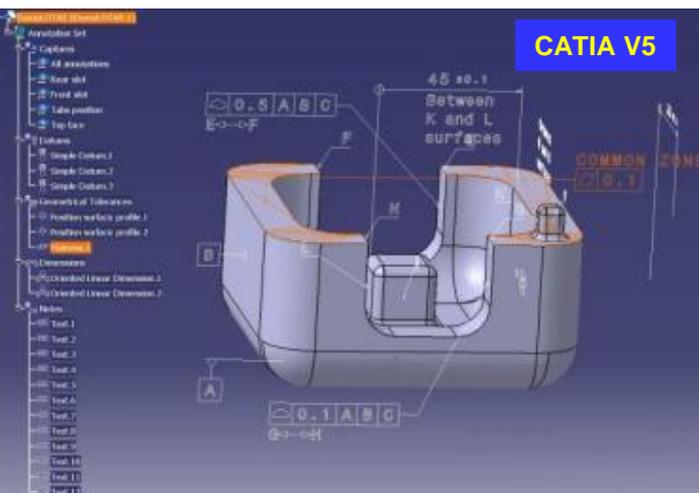
Specific properties associated to 3D geometry (UDA)



LOTAR Pilot 3 (2009) STEP with 3D PMI “polyline presentation”

- STEP Recommended practices for the CAD 3D PMI “presentation as polyline” implemented by the CAD vendor : Dassault Systèmes, Theorem and ITI

- The following figures shows example of conversion with STEP 3D PMI “presentation as polyline”



- Dassault Systems solution:
Catia V5-R19 GA SP2 (Q1 2009)

LOTAR - Composites

Product Description/Purpose:

For composites, the sub-group will address:

- **A Lack of Functionality** – Neither major composite vendor can properly design, manufacture, and support advanced, multi-function composite structures in a model based environment.
- **Product vs. Part Representations** – Current applications only support implicit representations of lamina ply geometry and meta-data. To do Model Based Definition (MBD) properly requires explicit representations.
 - **Support for Neutral Exchange Formats**– Numerous use cases (LOTAR, design re-use, multi-CAD, and consumable MBD) require a neutral exchange format such as STEP AP203e2 and then AP242e1. Future explicit MBDs will be focused on tessellated representations linked to meta-data such as material, orientation and rosette reference.

Deliverables:

- Additional Test cases and Use cases
- Generate Validation properties
- Development of LOTAR standards – Parts 300 & 310
- Updated STEP Composite Recommended Practices
- Enhancement of STEP standard
 - Contributions to 3D tessellated geometry pilot
 - Contributions to “External element reference” pilot
- Preparation of a summary page for LOTAR website

Status – Progress to Plan from previous Workshop:

- Develop detailed 2012 workplan
- Work Breakdown Structure

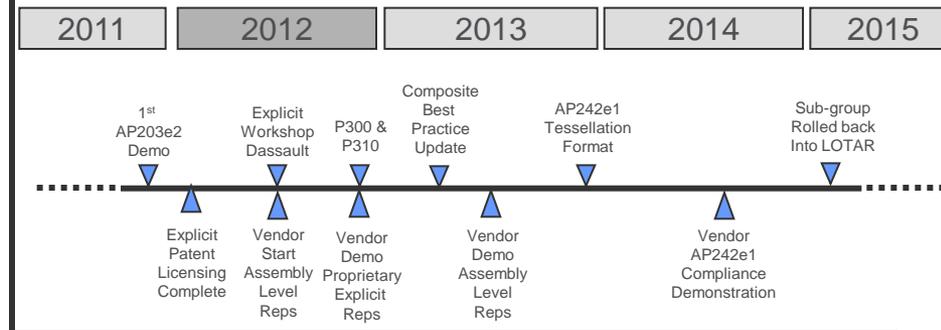
Action Items before next Workshop:

- Weekly Teleconfs
- Identify interdependencies with other standards
- Glossary for Composite terms
- STEP Composite Recommended Practices
- Preparation of STEP AP 242e1 composites information
- Preparation of initial drafts LOTAR for Parts 300 and 310

Dependencies/Issues/Actions:

- Boeing Patent Licensing
- Commitment from Composite Tool vendors to CEVACS/LOTAR
- Advanced Composites (Multi-purpose) not currently implemented
- Product Level structures not currently addressed
- Rosette representation/transformation still not completely implemented
- Scalability issue still needs to be addressed

Schedule:



Performance:

Schedule:	G	Technical	Y
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LOTAR “Electrical Harness” WG

(status 19th of March. 2012)

Project Description/Purpose:

- Development of LOTAR parts for Long term archiving and retrieval of electrical harnesses
 - Part 400: “fundamentals and concepts for LOTAR of electrical harness”
 - Part 410 “LOTAR of CAD 3D elec. harness definition”,
 - Part 420 “LOTAR of CAD 3D elec. harness installation”,
- To support the development of the STEP AP 242 ed2 standard for LOTAR and interop. of electrical harness
- To set up pilots / prototypes demonstrating the feasibility of the new concepts specified by the P4XX standards
- To ensure the appropriate coordination with the CAX IF

Deliverables:

- New LOTAR parts of the family 4XX
- Processes, use cases and test cases
- Essential information and associated Validation Properties / verif.
- Test round reports and prototypes of PLM vendors
- Support to the prep. of STEP AP 242 ed2 for Electrical Harness
- Communication actions (LOTAR public web page, ...)

Dependencies / Issues / Actions

- VDA VEC / KBL recommendations (AP 212), STEP AP 210 , AP239
- Preparation of STEP AP 242 ed2 for the Sept. 2012 workshop

Performance:

Schedule	G	Technical	G
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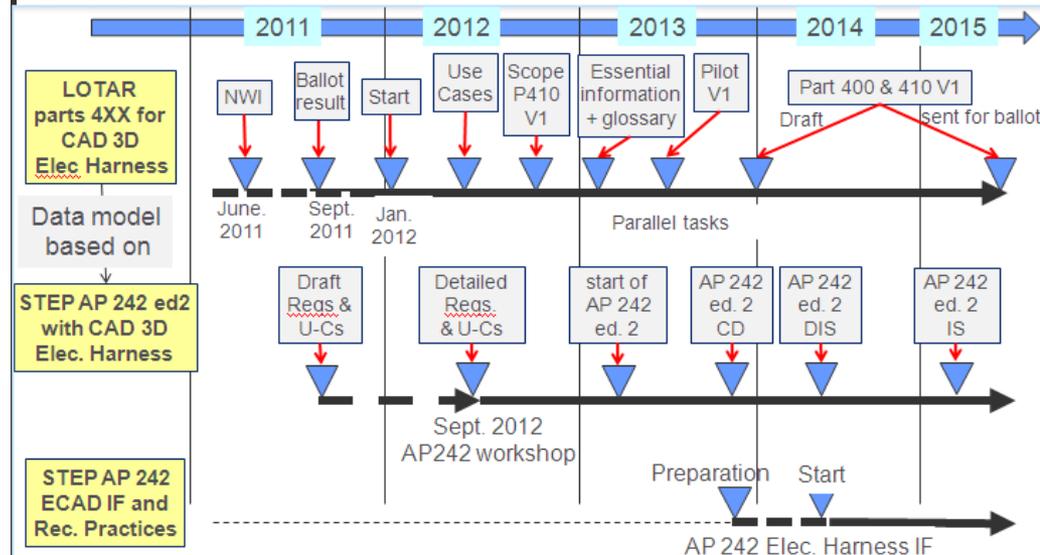
Achievements since the previous workshop :

- Bi weekly teleconferences started (28 Feb, 13 Mar.)
- Review of business requirements (P1: Certification)
- Start of review / preparation of a glossary
- Start of review of LOTAR use cases
- Start of identif. of interdependencies with other standards

Next Steps until the June Workshop:

- Review of use cases for LOTAR of 3D elec. harness definit. for certification, partial reuse and support in operation
- Continuation of the glossary for electrical harness definition
- Start of identification of the essential information
- Continuation of the overview of the VDA VEC standards
- Prep. of the project plan and planning of the WG for 2013
- Coordination with AIA EMC, ASD SSG, PDES Inc and ProSTEP iViP for the prep. of AP 242 ed2 for Elec. Harness

Overall Schedule:



Overview of the LOTAR standards P2XX for Long Term Archiving and Retrieval of Product Management data

<i>Data domain specific part</i>	<i>Document Number</i>
<i>Product Management Data in an as designed view</i>	<i>NAS / EN 9300-210</i>
<i>Product Management Data in an as planned view</i>	<i>NAS / EN 9300-220</i>
<i>Product Management Data in an as delivered/ maintained view</i>	<i>NAS / EN 9300-230</i>
<i>Product Management Data In-development (including prelim design review, critical design review, FAI, etc.)</i>	<i>NAS / EN 9300-240</i>
<i>Change documentation</i>	<i>NAS / EN 9300-250</i>

- 1 Preface
- 2 Scope
- 3 Normative References
- 4 General Terms, Definitions and Abbreviations
- 5 Applicability
- 6 Fundamentals and concepts for LTA of PDM data
- 7 Requirements for customization of off-the-shelf PDM systems
- 8 Methods of implementation of the given requirements
- 9 Preservation Planning for archived PDM information
- 10 Auditing in the PDM environment (specific requirements, constraints, etc.)
- 11 Administration and monitoring
- 12 Definition of Archive Information Packages for PDM Data
- 13 Conformance Classes
- 14 Annex

Ready for
internal ballot

LOTAR part 210 « L-Term archiving and retrieval of Product Management Data in an as designed view »



LOTAR
LONG TERM ARCHIVING AND RETRIEVAL

- 1 Introduction
 - 2 Normative References
 - 3 Terms, definitions and abbreviations
 - 4 Applicability
 - 5 Business scenarios and use cases for LTA of as designed PDM data
 - 6 Essential information for 'as designed' PDM data
 - 6.1 PLCS information subset in the scope of EN 9300-210
 - 6.2 Essential information common to all use cases
 - 6.3 Essential Information specific for each use case
 - 7 Core Information Model for LTA of as designed PDM data
 - 8 Qualification methods for LTA of as designed PDM data
 - 8.1 Verification rules
 - 8.2 Validation rules
 - 9 Conformance requirements
 - 9.1 Conformance classes
 - 9.1.1 Passive data, viewing format only (CC1)
 - 9.1.2 Partly re-usable Data (CC2)
 - 9.1.3 Allowing full re-use of data (CC3)
- Appendix A : Business scenarios

Title
under review

- Introduction – objective
- Overview of the LOTAR project
- Overview of the LOTAR standards
- Summary of implementation of LOTAR standards in Europe
- Overview of the Airbus project for Long Term Archiving and Retrieval of the A350 3D electrical harness installation
- Summary – next actions

Summary of implementation of the LOTAR standards in Europe

		LOTAR parts (CAD)				ISO formats	Project status
		CAD Assembly structure	CAD 3D exact geometry	CAD 3D tessellated geometry	CAD 3D PMI	ISO 10303 "STEP"	
European A&D company	A&D Product						
Airbus	A350	Yes	Yes	Yes	Yes	AP 214 ed3 + AP 242 ed1	In development
Dassault- Aviation	Falcon 7X	Yes	Yes		Yes	AP 214 ed3	In production
Snecma	New parts of engines	No	Yes	No	Yes	AP 214 ed3	In production

The CAD 3D LT Archiving projects of Snecma and Dassault-Aviation are described in other presentations

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EZMB/EZMI

LTA3D @ Airbus

Project overview

Prepared by:
Tobias Mueller
Jean-Yves Delaunay

Overview of Airbus A350 “LTA3D” project



Goal of the project is to provide a 3D archiving solution for the Definition Dossier

Scope & Key Objectives of the phase 1

- *CAD 3D LT archiving for A350 XWB 3D harness installation only*
- *The solution shall be EN9300 LOTAR compliant*
- *The solution shall be fully integrated into the existing release process, and LT archiving shall be done in the existing Airbus corporate archive*
- *ISO 10303 STEP format shall become the used neutral format for LT archiving of CAD 3D PMI and PDM*
- *An external audit shall be performed on the solution implementation*
- *The solution shall be deployed before A350XWB type certification*

Essential information to be archived

- CAD Assembly structure,
- CAD 3D exact geometry,
- CAD 3D annotation,
- CAD 3D tessellated geometry

EN9300 LOTAR standards applied

Basic parts:

- EN9300 part 1, 2, 3, 4, 5, 7

Process parts

- EN9300 parts 10, 11, 12,13,14,15

CAD 3D geometry domain parts

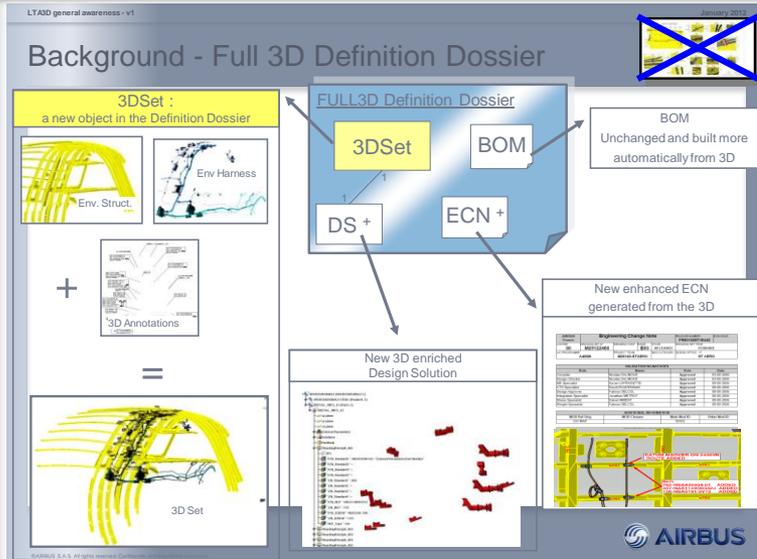
- EN9300 part 100, 110, 115, 120

LTA = Long Term Archiving

Background & Process of the Airbus A350 “LTA3D” project



Full 3D definition dossier



→ Usage of the “Full 3D” approach requires an implementation of a CAD 3D LT archiving solution to stay compliant with Airworthiness regulation

→ agreement with EASA has been reached on this subject for the A350 3D electrical harness installation scope

LTA3D “high level” process

Ingest

- Fully integrated in release process:
 - Conversion from native into to neutral format
 - Quality control of converted data using V&V
- Transfer to archive

Archive

- Fully integrated in corporate LT archiving solution:
 - Archival checks
 - Archival storage

Retrieve

- Launched from corporate LT archiving solution:
 - Retrieval of neutral archived format
 - Retrieval into native CAD format
 - viewing

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The LOTAR project and the coordination with other PLM standardization projects



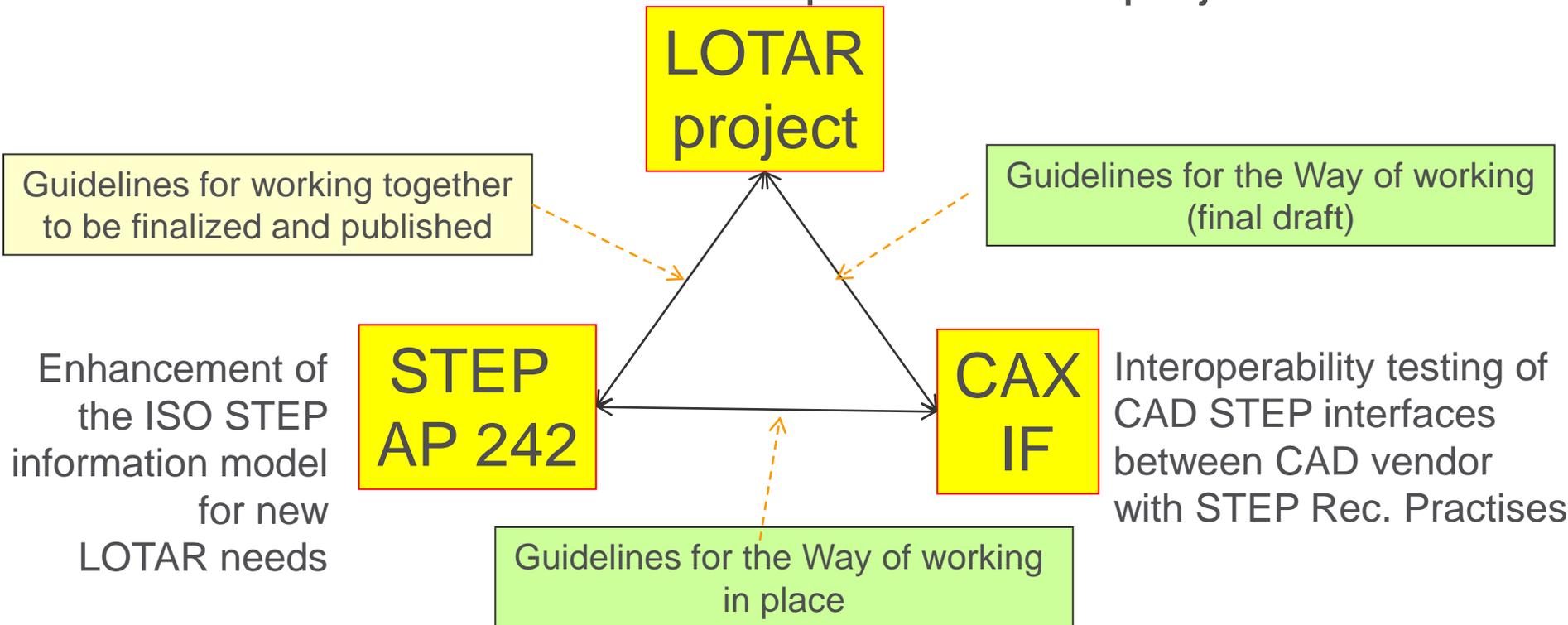
- The LOTAR standards define the processes, use cases, quality control rules, for the preservation of the PLM information
- They rely on other ISO TC 184 SC4 STEP standards defining the PLM information models

=> It relies on the setting up of a **coordination of the LOTAR project with other PLM standardization projects**, for example:

- Funding of STEP AP 242 and STEP AP 239 “Product Life Cycle Support” harmonization for PDM information model
- Funding of the STEP CAX Implementor Forum
- Funding of the development of specific functionalities of STEP AP 242,
- Liaison to be set up with ISO TC 171 “Technical documentation” for PDF A3 / PRC

Close interdependencies between the LOTAR project, the STEP AP 242 project and the CAX Implementor Founm (IF)

- The goal of the LOTAR project is to develop standards, in order to have successful operational solutions approved by the regulatory authorities (FAA, EASA)
- Need to have formal relationships with other projects



- The LOTAR project has **delivered standards now used** by the US and European Aerospace and Defences manufacturers
- The LOTAR project **prepares new LOTAR standards** in order to extend the current capabilities :
 - PDM « As design », CAD 3D composite design, CAD electrical harness
 - recommandation for LT Archiving of 3D light visualization
- **Recommendations** to the European A&D companies:
 - **to learn more** about the LOTAR standards
 - **To start to implement** the LOTAR standards for L-T Preservation of CAD 3D with PMI information (according to their business requirements)

Back up slide

As technology evolves, military wrestles with preserving vital engineering data”

By Chris Carroll Stars and Stripes - Published: January 16, 2012

“...Because of budget constraints and strategic necessity, systems such as the B-52 — expected to stay in service for nearly a century — have incredibly long life spans, said Mark Conrad, an electronic data preservation specialist for the National Archives and Record Administration ...”



“...The basic strategy for preserving data calls for every design, including manufacturing and product support data, to essentially be put in cold storage using a system developed through the International Standards Organization called STEP, or Standard for the Exchange of Product Model Data. ...”

