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The Governance of Data Sustainment:

How do we replace our New PLM System?

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Focus

Sustaining PDM data as

- A problem of Governance and Process

Not

- Technology of bits and bytes

Key Question –

How do we **reliably** retain detailed design metadata recorded in PLM and PDM systems?

The question is about how a business uses IT, rather than about IT itself

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Key Facts

- 2nd largest global defence company
- 105,000 highly skilled people
- Global capability
- Customers in over 100 countries
- Annual sales exceed £18.5 billion
- More than 100 new inventions every year

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Advanced Information Processing

Network Enabled Capability

Autonomous Systems

Homeland Security

Decentralised Data Fusion

Shared Situational Assessment

Wide Area Surveillance

Distributed Co-operative Control

Robotics

Information Fusion and Management

Signal Processing

Tracking

Knowledge Management

Ontologies

Information Exchange Standards

Learning

Adaptive behaviours

Intelligent Collision Avoidance

Uninhabited Air Vehicles

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We provide solutions for the automatic acquisition, manipulation, fusion, storage, management, sharing, interpretation, processing, and use of data, information and knowledge. We deliver technologies across the range of TRLs, that are more interoperable, better integrated, and of higher performance, to improve our customers' situations.

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Contents

- Overview of LOTAR
  - LOTAR Basics
  - What's in a name?
- Governance through Preservation Planning
  - Business strategy
  - User Drivers
- PLM/PDM and Preservation Planning
  - Preservation Planning Challenges
  - Evidential Weight
  - Effects of Process Change
- Conclusions

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What is LOTAR?

Joint European/US standard
for best practice
in long term data retention
in the aerospace industry

Driver for civil sector:
Electronic certification by
FAA and EASA

Site web :
http://www.prostep.org/lotar/

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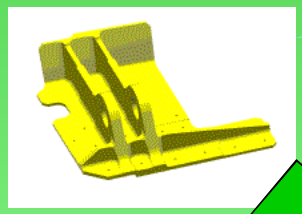
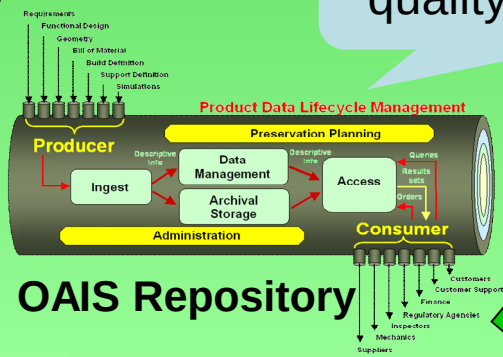
LOTAR on a Page

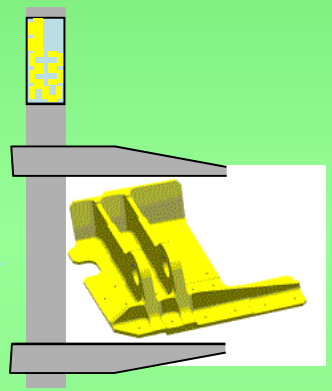
LOTAR identifies *use cases* for CAD Assemblies, PDM, etc



LOTAR adds *use case* quality checks to OAIS



OAIS Repository

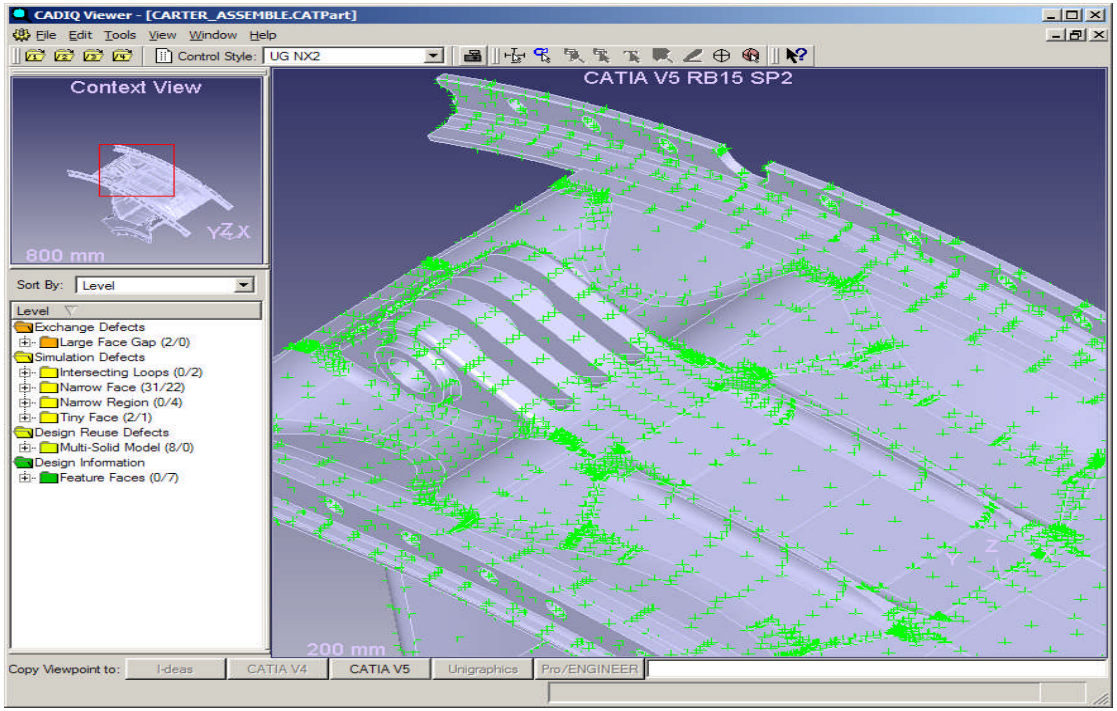


LOTAR sets *use case* integrity checks on recovered data

Validation –

what comes **out** is
what went **in**

Validate that the new software reads the old data correctly



Example – CAD 3D models and Cloud of Points:

Are points still on the surfaces and edges?

Image courtesy ITI TranscenData & SNECMA

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What's in a Name?

LOTAR = Long Term Archiving and Retrieval of Digital Product Technical Documentation such as 2D, CAD and PDM data

BUT Archiving?

- Long term *archiving* – file and forget?
- Long term *data retention* – remember where you put the filing cabinet?
- Long term *data sustainment* – emphasise active stewardship

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Preservation Planning – what is it?

- Systematic monitoring
  - of the business and technical environment
  - to ensure that data retention
  - meets the needs
  - of the business
  - and its designated communities

(Designated community – the users who in the future will read the retained data)

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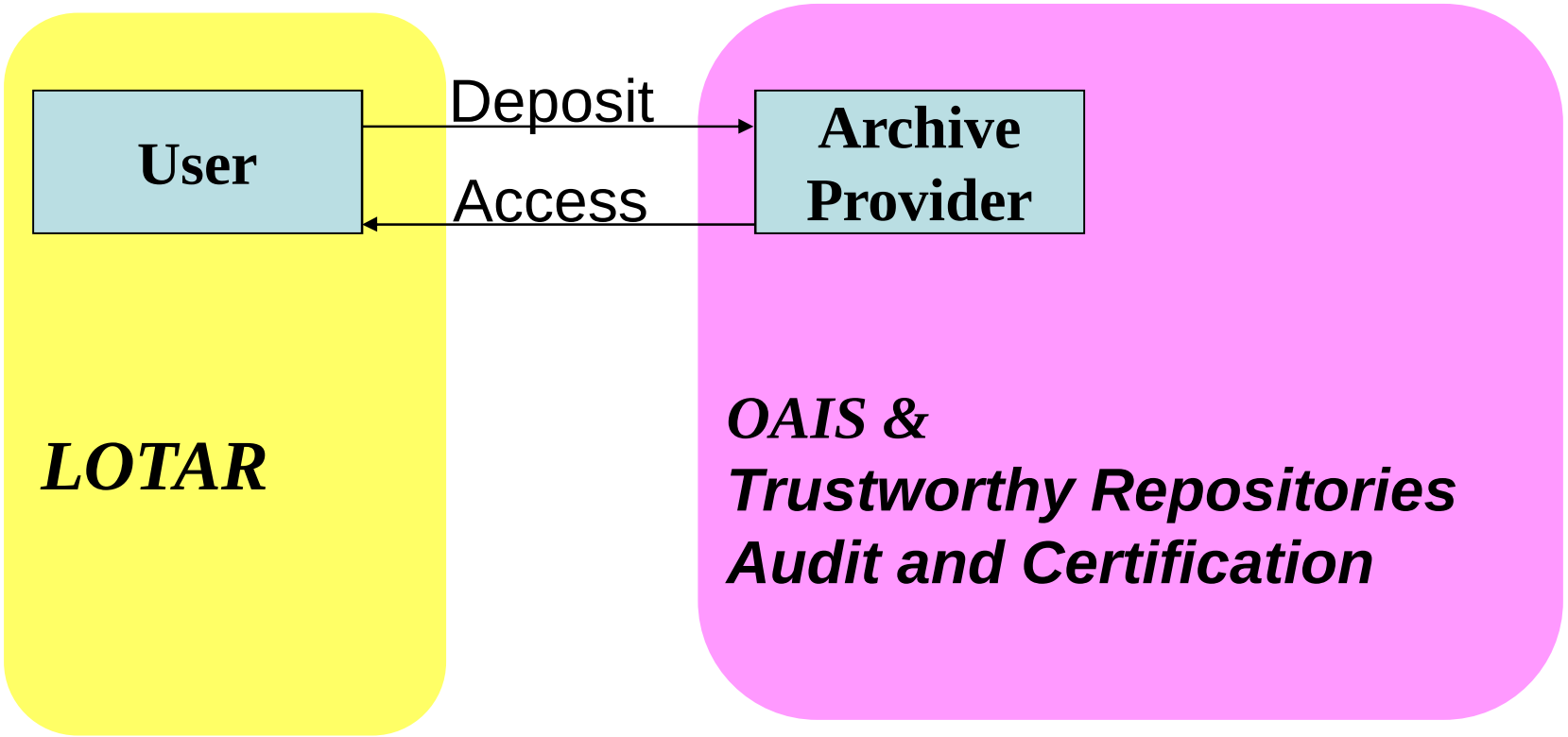
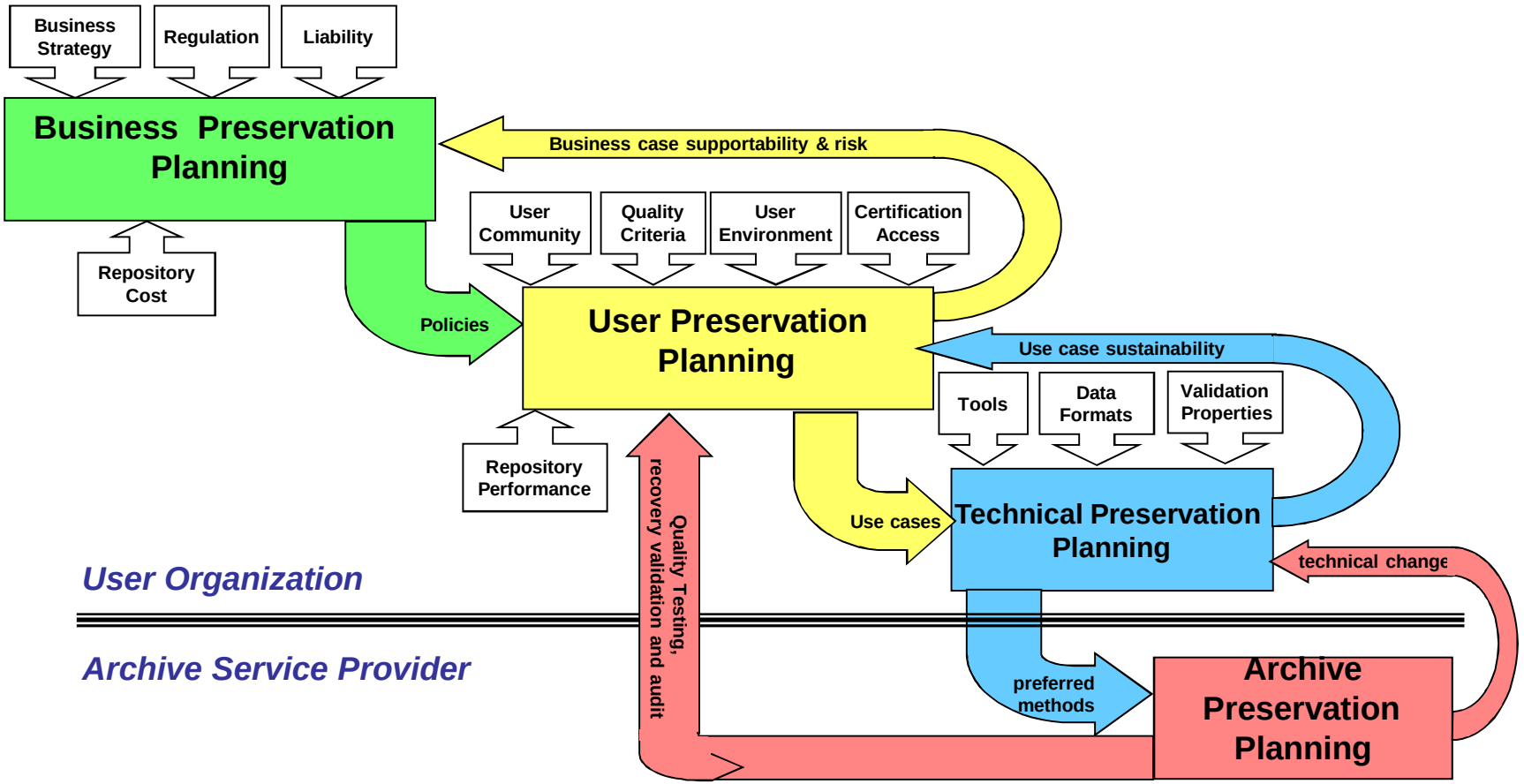
Preservation Planning

Simplifying assumption - Separation of Responsibilities



Preservation Planning
– Ongoing Governance Processes



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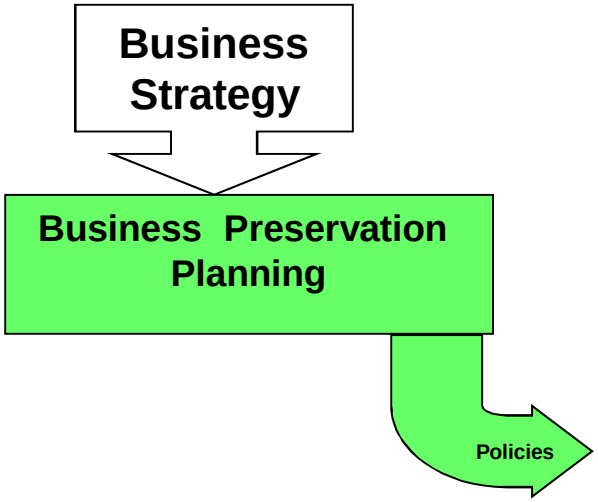
Preservation Planning – business strategy



Example 1: Acquisitions and Mergers

- **Are preservations plans properly costed?**
- **How will a merger affect the designated communities?**

Example 2: Product or Service?

- **If we sell an aircraft, cost of design change falls on purchaser**
- **If we lease and aircraft, cost of design change falls on us**

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Strategy - How will we replace PDM?

- The product will outlast the PDM system
  - 40 to 70 years for an aircraft, only 10 for PDM
  - Type data is maintained for the life of the aircraft
    - Regulator driven change
    - Aircraft conversions and equipment upgrades
    - Changes in suppliers
  - Product instance data
    - Keep product structure up-to-date, especially lifed parts
    - Tracking concessions, wavers, repairs, limitations

Therefore, question on Day 1

- if we buy this PDM, how will we replace it?

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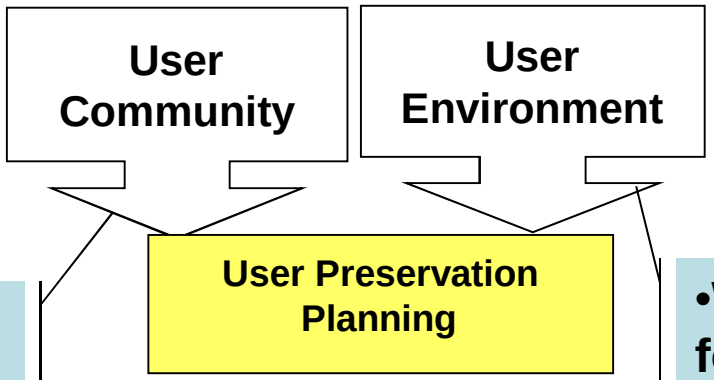
Preservation Planning – user drivers



- Will future users understand old data?
- Will they understand old technology?
- How will processes change the meaning of data?

- Will there be licences for old software?
- How will future systems maintain links to data files?
- How do we preserve evidential weight?

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PDM Preservation - functions

- Change management
  - the history of change requests and change orders
- Configuration status accounting
  - tracking status and approvals for configuration and other controlled items
- Data management
  - keeping track of design models such as CAD files
- Product structure management
  - tracking assembly and system trees and their effectivities;
- Database for product data not otherwise embedded in design models
  - Such product data is generally linked to the product structure

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PDM Preservation - Challenges

- Change management
  - retain links to change targets after archive and reload
  - reuse of design knowledge
- Configuration status accounting
  - Evidential weight that change is complete and is implemented
  - process change – change in the meaning of “status”
- Data management
  - Evidential weight that the data linkage is retained
- Product structure management
  - Need to reload into a PLM system to access
  - Consistency between structures and use of structure deltas
- Database for product data
  - Changes in system customisation

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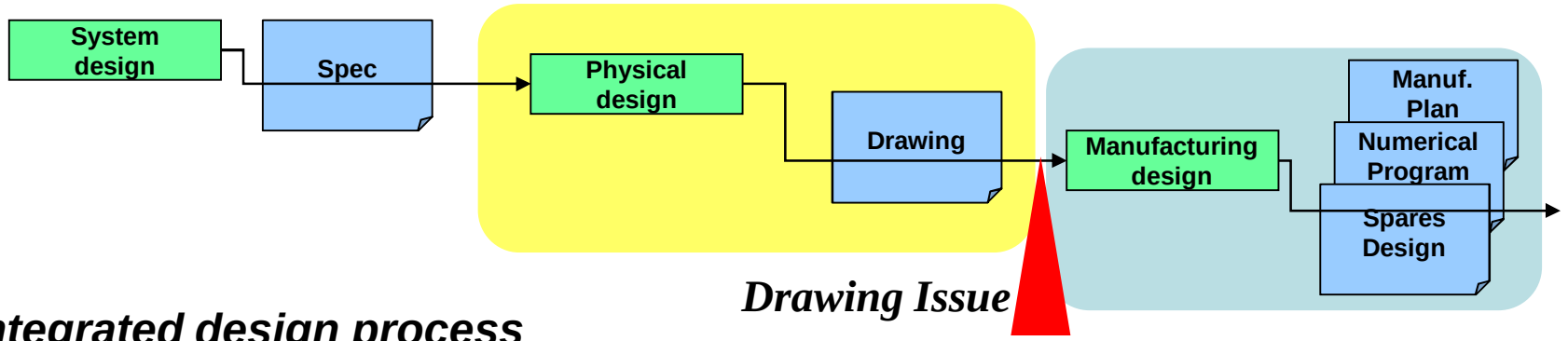
Evidential Weight – what is it?

In a legal case, computer data must have “evidential weight” that is accurate and unchanged.

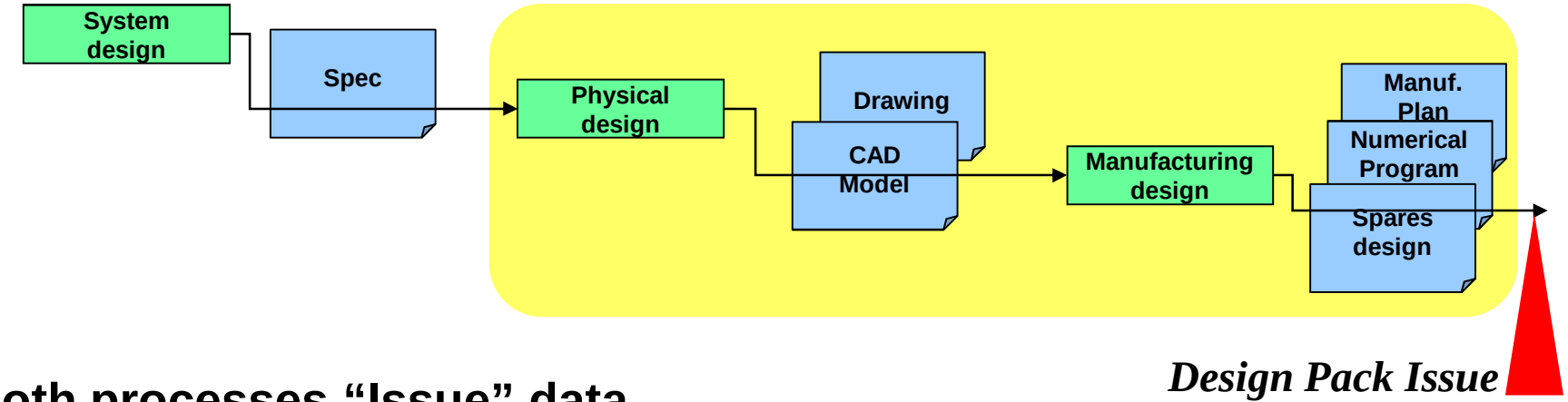
- Needed for
  - Product liability
  - Patents and proof of intellectual property
  - Business regulations
- Evidential weight comes from
  - Well defined procedures for managing data
  - Audit trails against the procedures
  - External audit for procedures testing audit trails
- Demonstrate that
  - the live data is well controlled
  - the path between PDM system and the Archive is well controlled
  - the Archive is secure
  - the recovered data is correctly displayed and interpreted

Process Change – effects on data

"Over the wall" processes



Integrated design process



Both processes "Issue" data

Integrated process data is a higher level of design maturity

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Conclusions

- LOTAR is a business standard for long term data sustainment – it is not about IT functionality
- Planning for data sustainment is an ongoing process – or series of processes – starting at the level of business strategy
- PDM provides particular challenges
  - Need to maintain the product structure
  - Evidential weight
  - Effects of changing understanding of data

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backup

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LOTAR – Current status

1 Structure

- 2 Requirements (harmonised AIA ASD-STAN)
- 3 Fundamentals and Concepts
- 4-7 Other basic Parts

10-15 OAIS Processes

- 2x Preservation Planning

100 CAD Fundamentals

- 110 CAD Explicit Geometry
- 115 CAD 3D Assembly Structure
- 120 CAD 3D Explicit Geometry with PMI

200 Product Data Management

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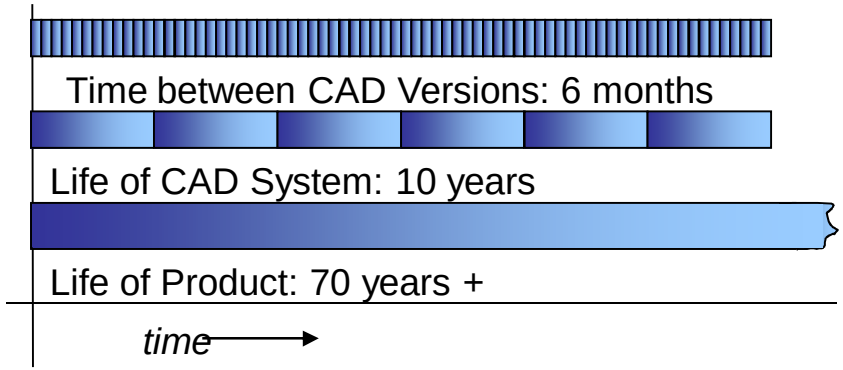
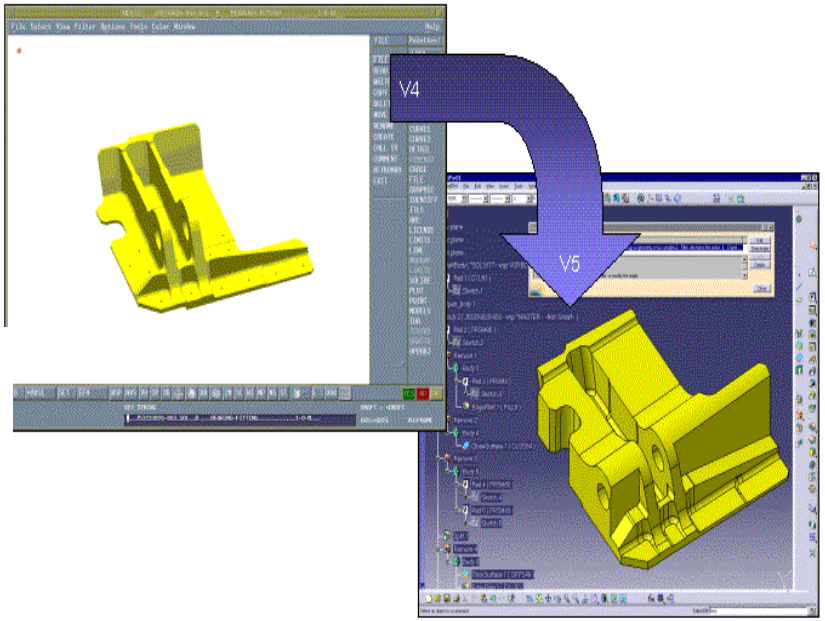
Why Sustain Data?





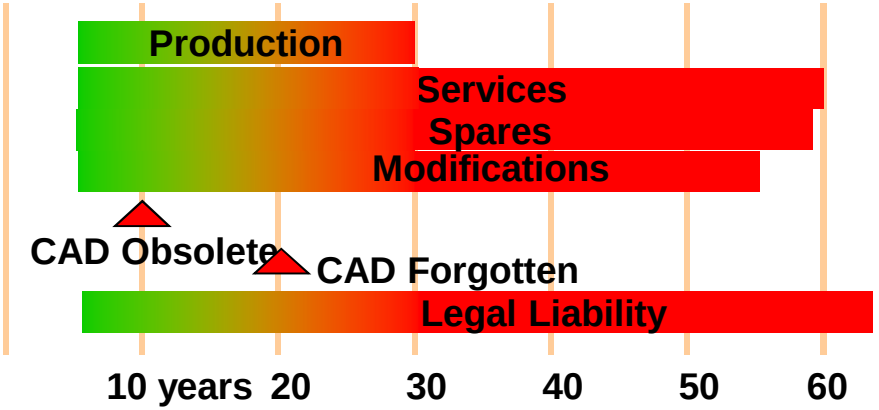


Image courtesy PDES Inc