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Standards for designing and maintaining the Digital Twin

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What is the Digital Twin?

- The *digital twin* refers to a digital model of a particular asset that includes design specifications and engineering models describing its geometry, materials, components and behavior. More important, it also includes the as-built and operational data unique to the specific physical asset that it represents.
  - For example, for an aircraft, the digital twin would be identified to the physical product unit identifier which is referred to as the tail number. The data in the digital twin of an aircraft includes things like specific geometry extracted from aircraft 3D models, aerodynamic models, engineering changes cut in during the production cycle, material properties, inspection, operation and maintenance data and any deviations from the original design specifications approved due to issues and work-arounds on the specific product unit.

Taken from: http://www.industryweek.com/systems-integration/demystifying-digital-thread-and-digital-twin-concepts

What is the Digital Twin? AP242

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What is the Digital Twin? AP242 and AP239

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Product Life Cycle Support (PLCS) *ISO 10303-239*

- A joint industry and government initiative to accelerate development of new standards for product support information
- An international project to produce an approved ISO standard within 4 years
  - Commenced November 1999
  - PLCS, Inc. closed down late 2004
  - Standard published by ISO in 2005
  - Edition 2 published in 2012
  - Edition 3 to be published 2020
- PLCS ensures support information is aligned to the evolving product definition over the entire life cycle

The Key Business Problem

How to keep the information needed to operate and maintain a product aligned with the changing product over its life cycle in a heterogeneous organization, process and system environment?

Product Definition Information

Maintenance Schedules

Tools

Test Equipment

Support Facilities

Storage Requirements

Training

Spares

Software

Consumables

Transportation

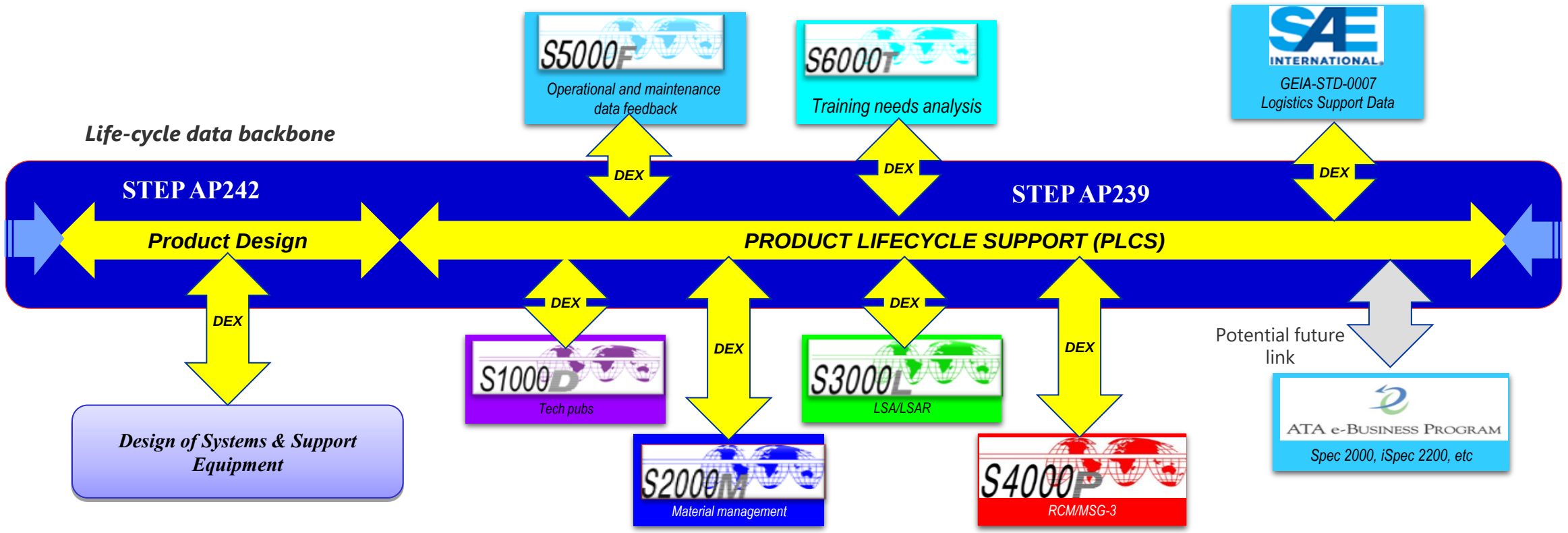
So what's the problem?

- We just use AP242 and AP239. Right?
  - Unfortunately with current editions this is not easily possible
  - Different groups developed the standards
  - Stakeholders needed different views on granularity of data:
    - Identifiers
    - Dates & Times
    - Breakdowns
    - Reference data
    - etc

Harmonization of standards

- Since 2016 the AP242 and AP239 groups have been working together.
- Harmonizing the underlying models and development methods
  - STEP Extended Architecture
- AP242 Edition 2 is the first to be published with significant harmonization embedded
- AP239 Edition 3 will follow next year
- This is just the first step, we also need
  - Common representation of Quantities and units (ISO 80000)
  - Common formats for sensors and sensor data (IoT, MIMOSA?)

AIA/ASD perspective



Goal: a coherent set of standards

Conclusions

- Digital twin for design and maintenance will be possible soon (2020)
- Wide recognition of the possibilities
- Other areas should be considered
  - Other STEP AP's
  - Other standards:
    - ISO 80000 International System of Quantities
    - MIMOSA

Thanks!

Learn more about PLCS at eurostep.com

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