Product Life Cycle Support (PLCS) – *Progress to implementation*

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Topics

- *What is PLCS?*
- *How can “PLCS” be implemented?*
- *Current status and intentions*
- *Questions?*

Product Life Cycle Support (PLCS)

Introduction

www.plcsinc.org

A joint industry and government initiative to accelerate development of new standards for product support information

An international project, started Nov 1999, to produce an approved ISO standard within 4yrs

PLCS will ensure support information is aligned to the evolving product definition over the entire life cycle

Product Life Cycle Support (PLCS)

Membership – July 2002

FORSVARSDEPARTEMENTET
The Royal Norwegian Ministry of Defence

FMV

Finnish Defence Forces

BOEING

BAE SYSTEMS

Rolls-Royce

DET NORSKE VERITAS

LOCKHEED MARTIN

HÄGGLUNDS VEHICLE

ÆROSYSTEMS INTERNATIONAL

EDS

PTC

LSC GROUP

Pennant

BaaN

INDUSTRIAL & FINANCIAL SYSTEMS

IFS

Product Life Cycle Support (PLCS)

Unique Value Proposition

- ***International Standard** for product support information - based on ISO 10303 STEP (AP 239)*
- ***Complete product lifecycle** – from concept to disposal*
- ***Single source** of assured product support information*
- ***Data independence** - Processes, Systems, Format*
- ***Interoperability** across enterprises and systems through:*
  - *Standardization of semantics for product support*
  - *Integrated suite of data models for data exchange and information sharing*
  - *Utilization of ISO STEP standards, methods and tools (incl XML/XSTL)*
- ***Extensibility and tailoring** through the use of Reference data libraries*

Customers, Contractors and Software Vendors working together to develop and implement a neutral data exchange standard for product support

Setting the Business Context

Business Drivers

Reduced Cost of Ownership

- *Users of products are seeking improved availability, reliability, maintainability and lower cost of ownership.*

Exploit investment in product data

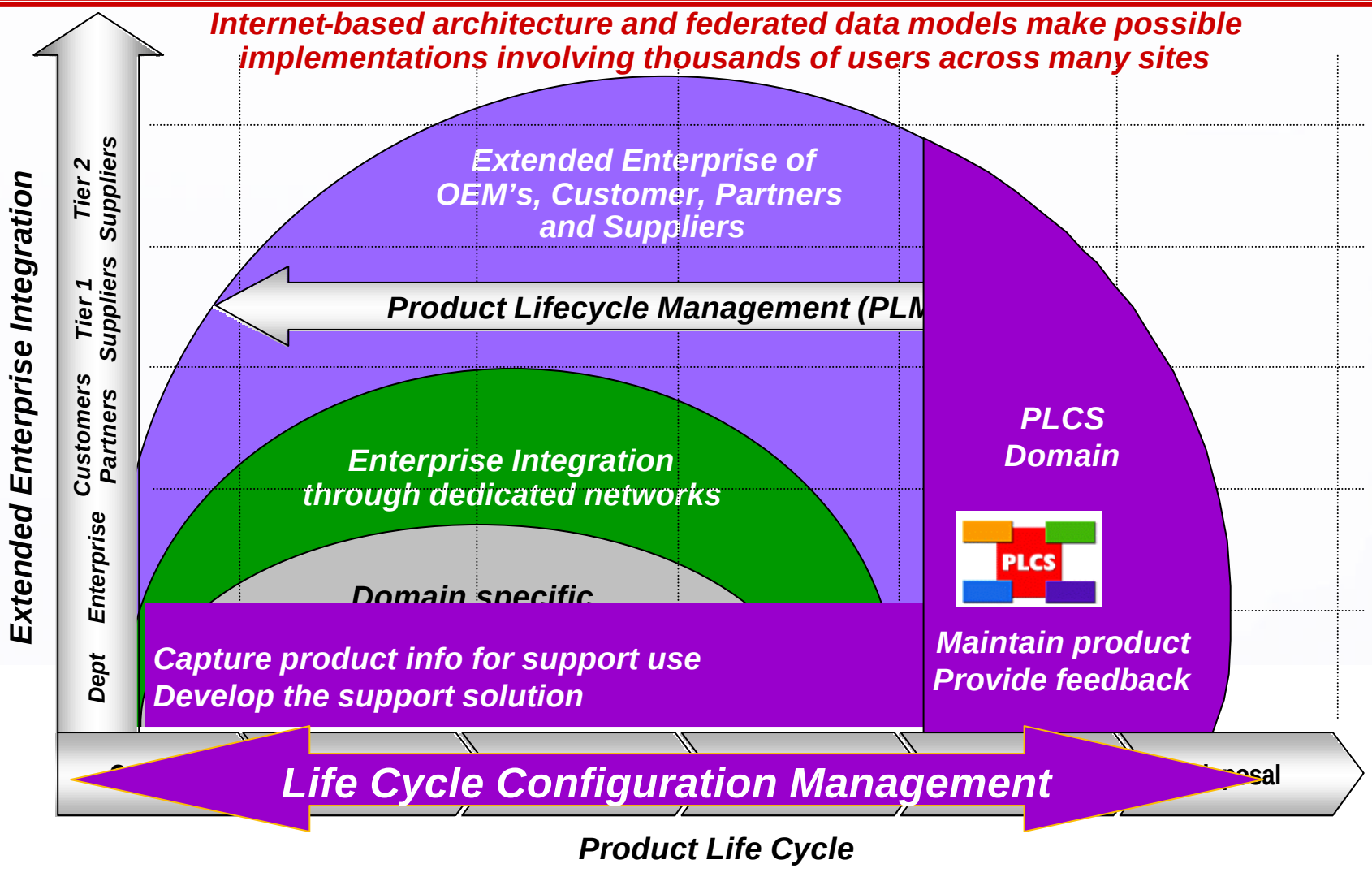
- *Users of information systems want more open platforms to reduce IT costs and ensure longevity in use of information*

Sustainable Business Growth

- *Companies are seeking to make money through the life cycle support of their products to improve profits, improve quality and be more competitive*

Product Life Cycle Support (PLCS)

Extended Enterprise enabled by Internet technology



Product Life Cycle Support (PLCS)

Business Problem addressed by PLCS

How to keep the information needed to operate and maintain a product aligned with the changing product over its life cycle?

Product Definition Information

Operating and Fault States

Support Task & schedules

Tools

Support Facilities

Storage Requirements

Training

Spares

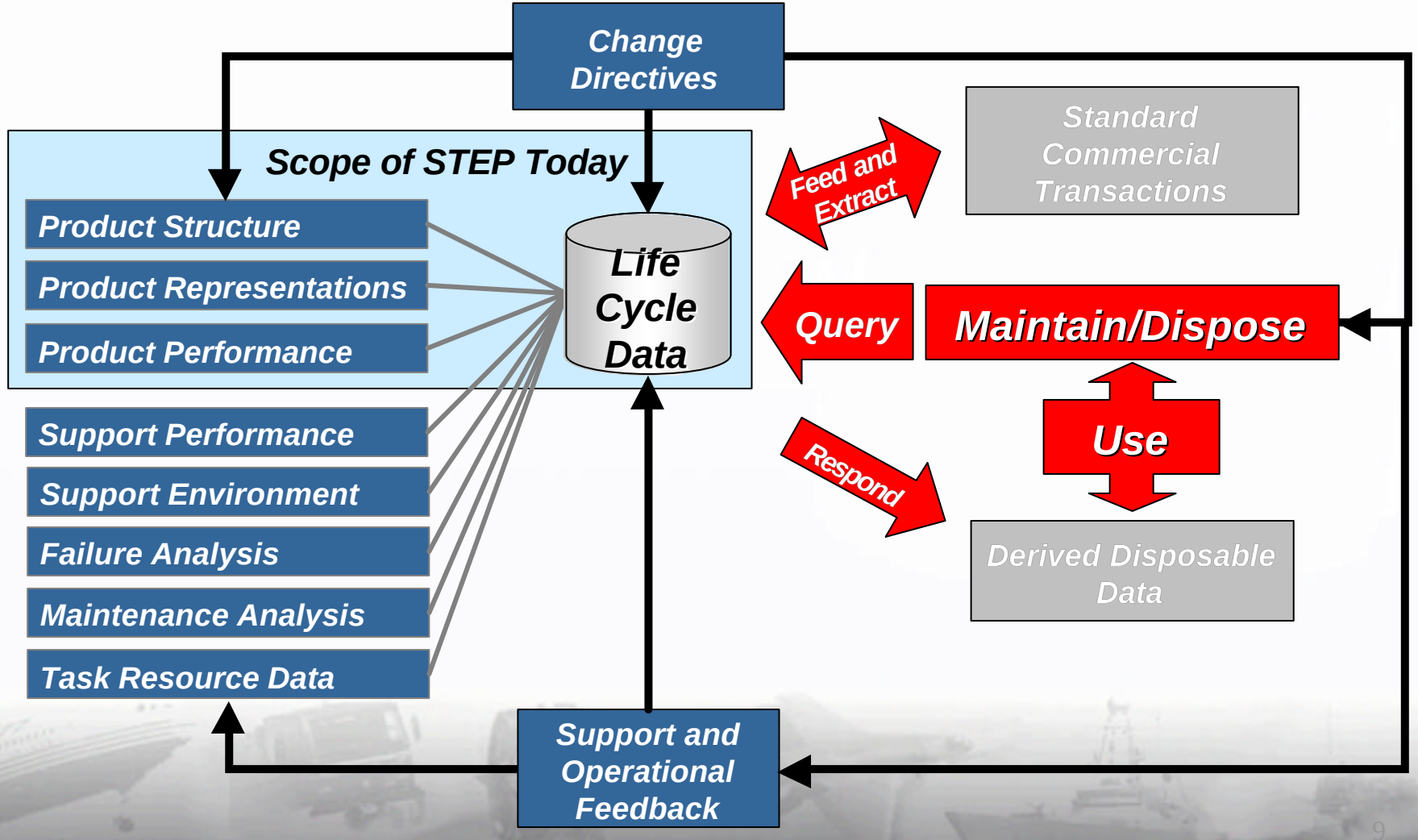
Software

Consumables

Test Equipment

Product Life Cycle Support (PLCS)

Scope of the Initiative



Product Life Cycle Support (PLCS)

Is product data really so important for support?

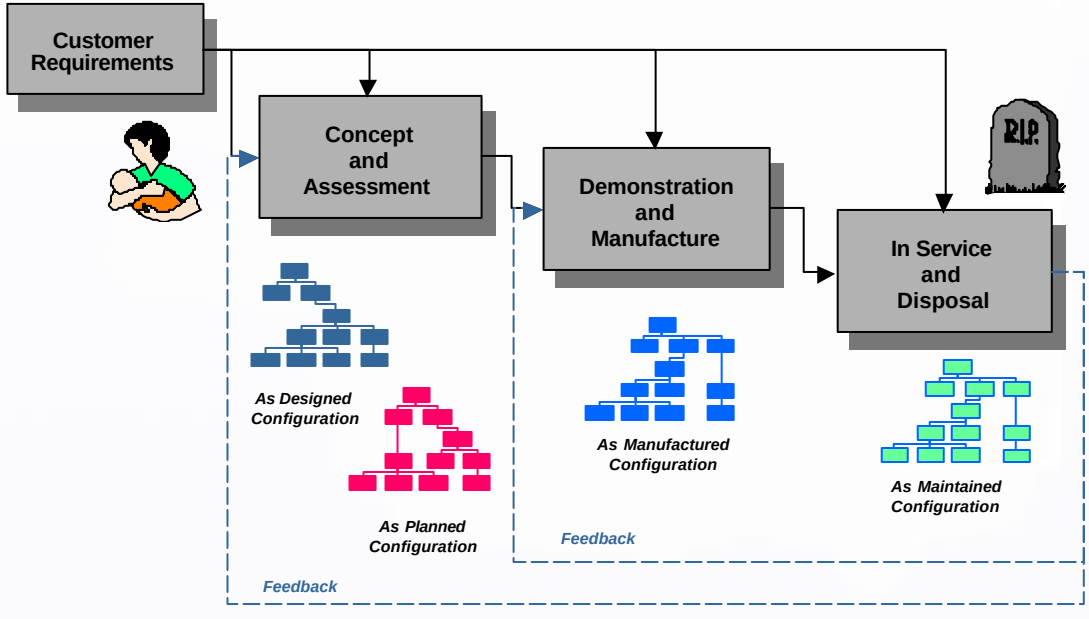
- *USS Vincennes has 23.5 tons of paper above the deck which is a greater weight than weapons*
- *F-16 requires over 3500 manuals*
- *C-5 technical documentation will not fit inside the aircraft*
- *5-9% of fatal accidents in the military traced to documentation errors*

Product Life Cycle Support (PLCS)

Configuration Management is a major challenge

- *Major problems keeping information to operate and maintain a product aligned to actual product configuration through life*
- *Need to manage multiple product views, across enterprises*
- *Need to manage configuration of real product , during and after manufacture*
- *Major problems linking support information to product information (tech docs & training info)*
- *Neither STEP nor current CAD/PDM/ERP systems have full Life Cycle CM capability*

ISO 10303: STandard for the Exchange of Product Model Data – STEP



PLCS (AP 239) will extend STEP to meet Life Cycle CM requirements

Product Life Cycle Support (PLCS)

Capabilities enabled by PLCS – ISO 10303 AP 239

Product Description

Capability to define product requirements and configuration, including relationships between parts and assemblies in multiple product structures (as-designed, as-built, as-maintained)

Work Management

Capability to request, define, justify, approve, schedule and capture feedback on work (activities) and related resources.

Property, State and Behaviour

Capability that describes and captures feedback on product properties, operating states, behaviour and usage

Support Solution and Environment

Capability to define the necessary support for a given set of products in a specified environment and to define support opportunity, facilities, personnel and organizations

Product Life Cycle Support (PLCS)

Opportunities and Risks

Major opportunities to exploit digital data include:

- ***Write once – use many times: e.g. re-use of the Product Model for technical documentation***
- ***Manage support information as a single assured source***
- ***Automate capture of feedback, as work proceeds***
  - *improved configuration management;*
  - *in-service costs,*
  - *improved asset management*
- ***Automate links across e-business initiatives (PDM, ERP, LSA, product support)***
- ***Enable distributed working and the 'virtual enterprise'***

However there are risks:

- ***Understanding – do I understand the context in which information is provided***
- ***Data access – how do I avoid being locked into proprietary formats?***
- ***Change Management – do I have the right version?***

AP239 will help address these risks for owners of major assets

Product Life Cycle Support (PLCS)

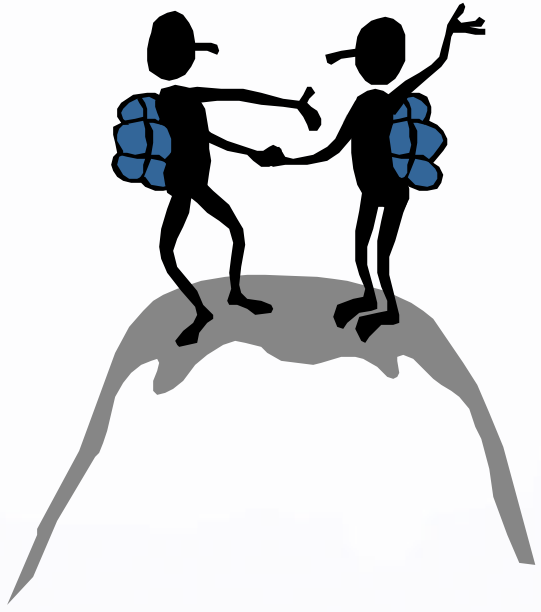
Goals and Approach

PLCS Business Goals

- *Improve product availability*
- *Reduce operating, support and maintenance costs*
- *Improve quality and accessibility of Product Life Cycle Support information*

PLCS Technical Approach

- *Accelerate technical development of the ISO standards*
- *Encourage early implementation commercial software vendors*
- *Encourage early industry participation in the development and testing of the standard*



Implementing PLCS

- *PLCS will deliver a standardized information model – ISO 10303 STEP Application Protocol 239 (a major, new, modular AP)*
- *AP239 can be implemented in three ways:*
  - *As an **integration architecture** for a new product life cycle support management system (c.f. PIPPIN, EPISTLE, ISO 15926, NCDM)*
  - *As a **mapping between selected systems** (APIs) (RAF LITS to RR CM system)*
  - *As a **standardized data exchange capability** (an AP239 Conformance Class)*
- *STEP technology supports all three and is language independent (Cobol, Java, C++, XML)*
- *AP239 can also be used to promote further standardization via Reference Data (e.g. fault codes, skill grades)*

Start point for Implementation

- *Most product design for major assets is now IT based*
- *Many CAD and some PDM vendors have already implemented STEP (203/214) for product design. STEP for manufacture is growing fast*
- *Life Cycle CM is clear goal for many new programs (e.g. JSF)*
- *Most current product support applications are stand alone, with manual data entry*
- *Much support data, including in-service feedback, is still paper based*
- *Newer assets have increasing "on-board capability" for diagnostics and status reporting*
- *ERP widely used stock and maintenance management, but has poor links to product data*
- *EVERY new asset based project uses a large extended enterprise*

Using a STEP AP for data exchange

The long route:

- ***Define and model the data to be exchanged (develop the AP)***
- ***Develop software interface to achieve standardized export/import capability for each relevant system (implement a DEX)***
- ***Test the export/import capabilities (test rallies)***
- ***Agree business protocol & processes for file exchange***
- ***Test and validate the business exchange processes (pilot)***
- ***Adopt proven exchange capability for program use***

- ***Short route:***
  - ***Buy compliant software***
  - ***Use it!***

Implementing PLCS on a new asset program

Use PLCS/STEP formats to capture design information as it is generated in a way that support engineers can re-use

Develop Support Information in PLCS format

- *Less duplication – single assured source*
- *Easy to present or deliver any required format/appearance*
- *Improved management of effectivity/applicability*

Deliver a PLCS compliant maintenance management capability

- *The right data is available for maintainers (and can be easily changed)*
- *Improved feedback collection (report in the language used to specify)*
- *Better in-service metrics*
- *Faster learning*

Implementing PLCS for an existing asset program

DO:

- ***Identify current information shortfalls or problems***
- ***Use the AP239 Activity Model to identify relevant data exchanges (arrows that cross IT system boundaries)***
- ***Automate appropriate data exchanges where there is a valid business case***
- ***Consider adopting AP239 format for any new data generated (changes, modifications, upgrades etc.)***
- ***Progressively extend use of the "single authorized source" concept***
  - *Cheaper to create*
  - *Cheaper to maintain*
  - *Improved data quality*
- ***Look to automate feedback capture to support critical metrics***

DO NOT abandon current systems that meet business needs!

Product Life Cycle Support (PLCS)

Implementation Plan

Year 1 - Nov 99 to October 2000

- *Develop and document process models, and associated process definitions, for the top level support processes*

Year 2 - Nov 2000 to October 2001

- *Develop and document data exchange modules*
- *Develop initial technology demonstrators*

Year 3 - Nov 2001 to Dec 2002

- *Complete single integrated data information model and submit for ballot as ISO 10303 Application Modules*
- *30 Data Exchange sets defined as future AP239 Conformance Classes*
- *Test information capability*

Year 4 - Transition to Implementation

- *Publish AP239 as Draft International Standard*
- *Publish test results, usage guides and reference data to members*
- *Industrial testing, vendor test rallies and 1st phase implementations*
- *Promote widespread use of standard and establish user group*

Conclusions

- ***PLCS, Inc will deliver a major extension to STEP in 2003 with the publication of AP239 - Product Life Cycle Support.***
- ***The asset support business is badly in need of this new information management capability***
- ***Implementing AP239 will be like any other STEP implementation project:***
  - ***Hard work for early adopters***
  - ***Easier with time, as the compliant application base grows***
- ***PLCS, Inc has the necessary critical mass for success, at least in defence and aerospace sectors***
- ***Publication of AP239 is a beginning, not an end point, on the road to business benefits!***