World leaders in Industrial Data Management using ISO standards

**Data modeling**
Create your own data models, or use for viewing and documentation (ISO)

**Database management**
The ideal tool for data integration and application development projects

**Rule engine**
Validate your data sets, using your own business, knowledge rules or any other sets of rules

**Web services**
For use in web server applications (thin clients)

Universal Solutions for Interoperability and Sharing of Product Data
10 years of supporting Eurofighter
Aerospace related PLCS projects

Eurofighter

Gripen

JSF

ESA
Other PLCS projects
AGENDA

- Open Product Documentation and Information Management (OPDIM)
  - Product Data in Aerospace & Defence
  - Internal and External Requirements and Needs
  - Concept of OPDIM
  - Major Objectives of OPDIM
  - OPDIM-Program-Overview
  - Demo + PLCS Video
Product Data in Aerospace & Defence

2D - Drawing

3D - Model

BOM/ICR

Effectivities

Specifications

Systems

Product Support

Structures

Aircraft DMU

Page 7
Product Data in Aerospace & Defence (USER)

- Accounts Payable
- Inventory Management
- General Ledger
- Master Scheduling
- MRP
- Asset Management
- Accounts Receivable
- Purchasing
- Sales Management
- Order Svc Mgt
- Payroll Services
- Human Resources Mgt
- Project Management
- Product Design
- Product Data Management
- Shipping & Receiving
- Shop Floor Control
- Mfg Cost Control
- CRP
- Warehousing & Distribution
- Page 8
Product Data in Aerospace & Defence (TOOLS)
Internal & External Requirements to Product Data

Cost efficiency
- Processes
- Quality Assurance

Projects & Customer
- Project contracts
- Procedures
- Exchangeability

IT-Tools
- HW/SW
- Obsolescence
- Formats
- Strategy

Authorities
- EASA Part 21/145
- AQAP 2110
- AQAP 150
- LuftVG
- FAR
- ZdV 19-1

Standards
- EN 9100
- prEN 9130
- prEN 9300
- EN14001

Legal
- ProdHaftG
- BGB
- HGB
Key Requirements for Product Data Aerospace & Defence

- Config controlled
- Know How Preservation
- Problem Investigation
- Long Time Retention
- Re Use
- Concurrent Engineering
- Traceability
- Product Liability
- Exploitability
- Accessibility
- Availability
- Low Life Cycle Cost
Situation today

A380

email / phone / personnel networking

A400M

Paper Archives

• different processes
• individual archives (paper / digital data)
• individual data management
• unstructured data
• data redundancy
• passive archives
• limited / non-existing knowledge transfer

Drawings

EF

email / phone / personnel networking

EE

Working Documents

• no standards for archives
• knowledge transfer
• access of archives

Digital Data

LN10 -401 P/N - 802-801

GA
Summary of Requirements and Needs

- Gather ALL relevant product information
- Enable the user to structure local information
  - according to PDM structure
  - according to other useful breakdowns
- Enable efficient start of new projects
- Enable search
  - free text
  - structured
- Ensure privacy and security
- Enable offsite use
- Improve systems interoperability
  - Reuse of product definition data in support engineering
  - Smooth link back from support engineering to PDM
- Enable PLCS standard based data delivery to customers
- Enable efficient use of support feedback data
  - Smooth link from feedback data to PDM
Objectives of OPDIM

Harmonization of technical/non-technical data
- Redundance-free structured data archive
- One master document
- Harmonized communication (email, supplementary details)
- Individual Data Access
- Knowledge Mgmt
- Liability Proofs
- LTA
- Other LC Application (ISS)
- Maximize working archive
- enterprise wide
  knowledge/data sharing

…

Side Effects
- Less paper archives
- Less harddisk space
- …
Modular OPDIM Architecture

OPDIM based on PLCS

Product & System Structure Mgmt
Change & Configuration Mgmt
Document Mgmt

Team Center
CPI (Central Part Identification)

2D Viewing (ASAP)
3D Viewing (VisProducts)

Support

Product Definition Information
Maintenance Schedules
Tools
Test Equipment
Support Facilities
Storage Requirements

Team

PPS systems
SAP (VPPS, RAZI,)
ZPD - PCMS/KIS
ILS systems

In Service systems

Transportation
Consumables
Software
Spares
Training

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What and Why PLCS:

- PLCS is a data model that includes product definition and product operation and support
- PLCS is an ISO standard
- PLCS is a mature data model (3rd generation)
- PLCS is the most powerful specification for support publicly available
- PLCS is supported by NATO and several of its MoDs
- PLCS has compatible and relevant sister standards in ISO 10303, STEP
- PLCS is compliant with the ISO 10303 implementation methods
## OPDIM Key Potentials

<table>
<thead>
<tr>
<th>Design Goal</th>
<th>Benefit</th>
</tr>
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</table>
| Making systematically available individually archived / stored information | • Reducing cost for search  
• Facilitating information re-use  
• Facilitating knowledge management  
• Minimizing risk of lost of information  
• Facilitating harmonisation of individual IT environment |
| Filling gap between systematically in legacy systems managed and individually maintained information | • Avoiding redundant data storage  
• Reducing storage cost |
| Integrating office tools (Word, Outlook)                                   | • Enabling interoperability of systems throughout entire lifecycle  
• Facilitating data exchange, communication within supply chain  
• Facilitating extended enterprise approaches |
| Enabling of cost-efficient data integration throughout the entire product lifecycle | • Improving competitiveness by enabling new / improved services at competitive cost  
• Enabling reaction on up-coming customer demands |
| Enabling cost efficient value added services during support phase          | • Reducing project set-up cost  
• Facilitate harmonising of individual IT environment  
• Improving efficiency for early project phases / small projects  
• Facilitate ability of working in often changing project environments |
OPDIM
Enabling Information Management in all environments

Closing of gaps in IT environment within the company where information is not systematically managed thus enabling common infrastructures for individual data processing environment.

Distribution of Information in Archives

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Solutions Available</th>
<th>No Systematic Approach Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate</td>
<td>OPDIM offers systematic solution</td>
<td></td>
</tr>
<tr>
<td>Contractual Req</td>
<td>ERP, Teamcenter, CAD, FEA, ...</td>
<td></td>
</tr>
<tr>
<td>Formal Info</td>
<td>NDC</td>
<td></td>
</tr>
<tr>
<td>Work Info</td>
<td>Techpub</td>
<td></td>
</tr>
<tr>
<td>Paper Work</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Product Lifecycle:
- Concept
- Pre-design
- Design
- Manufacture
- In-service
- Disposal

Central Archives: 15000000 (35%)
Document Archives: 1370000 (33%)
Drawing Archives: 2213000 (5%)
Storage within Departments: 4500000 (23%)
Evolution of formal and less formal Product Data

Shorter development cycle of more complex products requires more flexible information management

Formal

Structured

Today

Structured

Tomorrow

PDM

ERP

DMS

Product Data

Structured

un-structured

OPDIM

Product Data

Structured

un-structured

Less Formal

Email

DOCs

PPTs

XLSs

TXTs

...
OPDIM W

Integrating Office Tools

Benefits:
• significant reduction of storage cost
• document controlled (all parties work on same document)
• availability of information beyond local environment

Ratio = 92%
OPDIM

New services during support phase

Enabling cost efficient value added services during support phase

InService Processes

- Accessory repair
- Fleet Management
- Repair & Overhaul
- Logistics
- Guarantee Availability
- Information managers

Condition Assessment

Planning

Communication

Data & Information

Support

Logistics

OEMs/Vendors

OPDIM

PDM

S/W Engineering

Requirements Engineering

Support Engineering

Office Environment

Communication Environment

Electronic Archives

Conventional Archives

PLCS

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OPDIM
Providing functions for document handling and communication for project teams

**Project A**
- local work / communication environment
- local directory

**Project B**
- local work / communication environment
- local directory

**Project C**
- local work / communication environment
- local directory

**Benefits:**
- reduce initialisation cost
- ease communication
- ease archiving
- facilitate knowledge mgnt.

**External Partner**
- Supplier

**Knowledge Mgmt.**
OPDIM – The project

- **Partners**
  - EADS Deutschland GmbH
  - Jotne EPM Technology AS

- **Funded by**
  - Norwegian Ministry of Defence

- **2+ year project; start Oct 2007**
- **about 2.5 m€**

- **Result of phase 1:**
  - Demonstrator of a comprehensive product information management system
    - desktop information integration and archival application
  - interfaces to PDM and ILS
Performance Trends

Product Improvement
- Fleet Analysis Tools
  - OLMOS / GSS
    - Tornado
  - Airman / MDS
    - EF 2000
    - A 380 / A 400 M
  - UCAVS / UAV
- IMRS / GSS
- SATCOM
- Wireless
- ACARS
- Internet Services
- Data Link

System Evolution
- Data Availability
  - Local independent data provision
- Information Quality Efficiency
  - System + platform level integration
- Scalability, Interoperability Efficiency
  - Complex system & process interactions
- Flexibility; Measurability
  - Services & systems composition & orchestration

Service Offers
- Full Service Support

System of Systems
- Sub-Systems & Equipment
- System & Platforms
- System of Systems
Possible Solution
Standardized data sharing enables the seamless integration of several functional support areas

System of Systems Support

- Platform/Fleet Management
  - Maintenance Management
    - Line Maintenance
    - Base Maintenance
  - Supply Chain Management
    - Repair of repairable
    - Consumable parts
  - Technical Management and Control
    - Engineering Change
    - Process and Specific Control
  - Training
    - Operator
    - Maintainer
  - Operability Management

Share data across functional areas to maximize overall efficiency

Manage different data sources
Same constituents in all PLCS solutions
OPDIM Client Main features

- Search and Retrieval
- Collaboration
- Distribution and Workflow
- Document Capture, Planning and Production
- Advanced Document Management and Revision/Version control
- Bulk import/export and batch document conversion
- Integrated Security
- Traceability / Audit Trail
- Integrated with standard applications like:
  - Microsoft Office and Outlook
  - Microsoft SharePoint
About the OPDIM Client Background

- Module based best practice solution for Document and Information management
- Developed to meet requirements in the Engineering domain
- More than 20 years of experience
- Supporting Document Lifecycle, from Planning to Operations
- Supporting work processes with collaboration, integrated workflow and distribution
- Handles of all types of documentation
- Easy to integrate with other systems
- Low cost of ownership
Discover PLCS in your MS-office application, not learning anything new.
THANK YOU!

QUESTIONS?

Further Information:
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