Integrated Information Management for TESLA

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Presentation for the
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CHEP 2003, San Diego

Agenda

- Introduction
- Life Cycle and Information Systems
- Technical Information Systems at DESY
- Status and Experience

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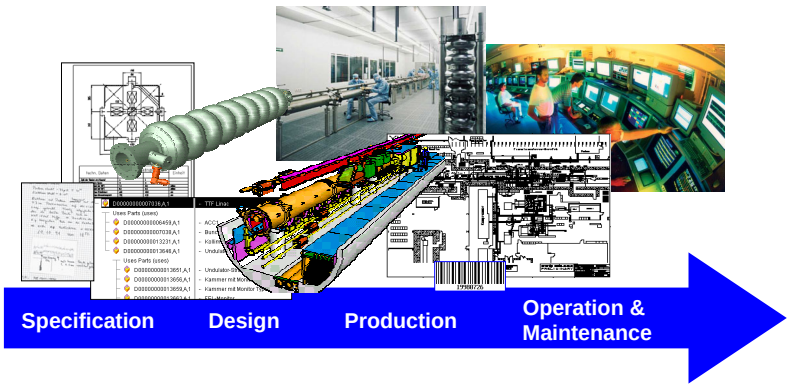
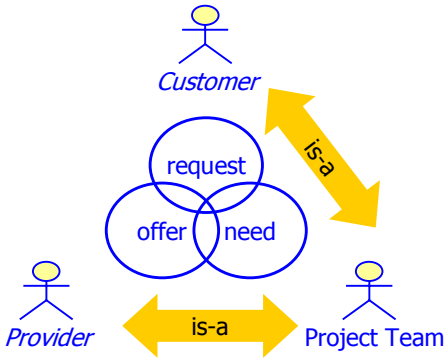
Accelerator Life Cycle

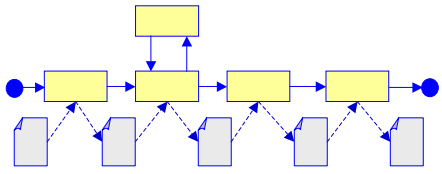


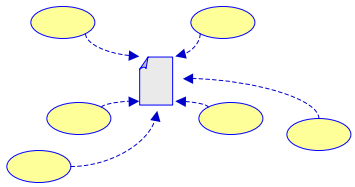
Key Concepts



- Information Management
  - ensures information supply within project (team)
  - adjusts the information which is requested, offered, and needed
  - organizes information flow and business processes
  - introduces and operates information systems
- Information System
  - IT application plus defined use cases which are part of key business processes

Working Models





- process-oriented company
  - e.g. insurance, banking, ...
  - defined processes/responsibilities
    - initiated by request, contract
  - hierarchical organisation
  - „transaction" working model
    - common to information systems
- HEP community
  - organic collaboration with ad-hoc processes / communication
    - initiated by common under-standing
  - loosely coupled expert groups („network")
  - „marketplace" working model

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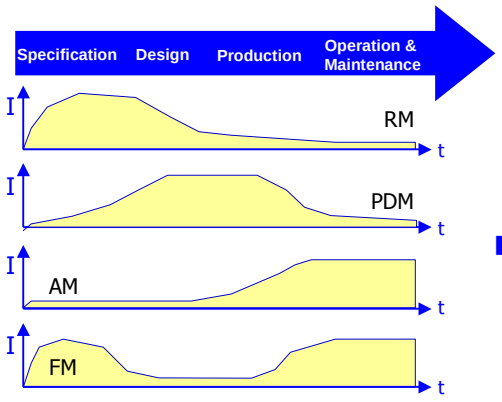
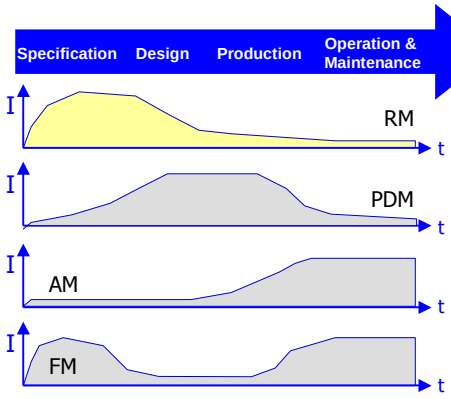
Information Management Along the Life Cycle



- selected disciplines along the lifecycle
  - Requirements Mgmt (RM)
  - Engineering Data Management (EDM)
  - Asset Management (AM)
  - Facility Management (FM)
- and many more
  - Project Management
  - Financial Engineering
  - ...

Information Management Along the Life Cycle



- Requirements Mgmt (RM)
  - Elicitation, Documentation, ... of **Requirements** on **Products**

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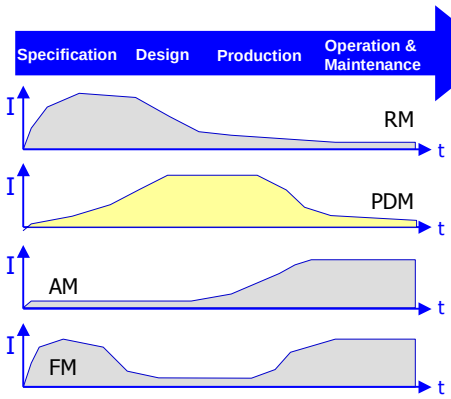

- Requirements Mgmt (RM)
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- Product Data Mgmt (PDM)
  - Development, Documentation, Change, ... of (Accelerator, Experiment etc) **Components**
  - Management of **Documents**

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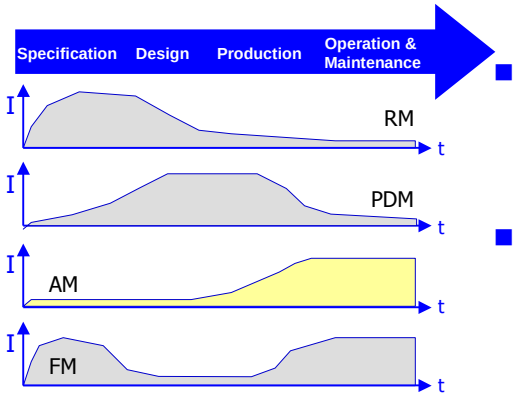

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  - Purchasing, Operation, Maintenance, ... of **Equipment**

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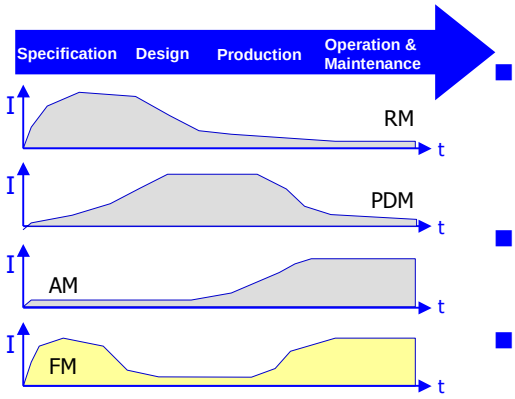

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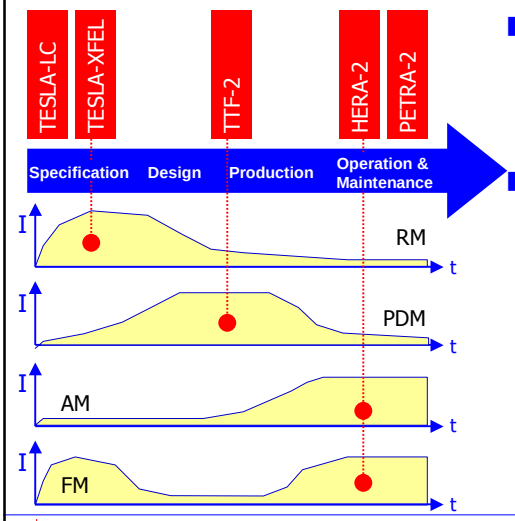
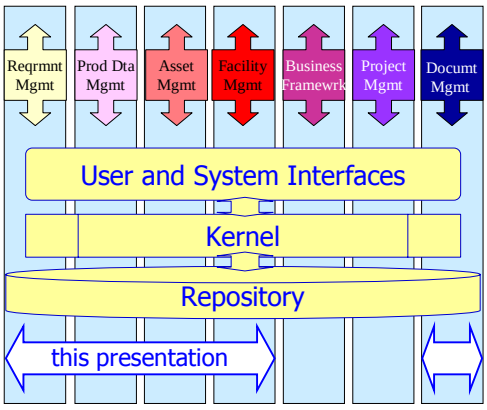
  - Management of **Documents**
- Asset Management (AM)
  - Purchasing, Operation, Maintenance, ... of **Equipment**
- Facility Management (FM)
  - Planning, Construction, Maintenance, ... of **Buildings**, **Installations** and **Maps**

Information Management Along the Life Cycle



- selected disciplines along the lifecycle
  - different intensities at different stages
- Information Management
  - introduction of different information systems (ie. applications and processes)
  - for different accelerators
  - which are at different life cycle stages

The Objective



- provide optimum systems for each life cycle stage
  - vertical systems for RM, PDM, AM, FM, ...
  - horizontal components for interfaces, business objects, data repository, reporting ...

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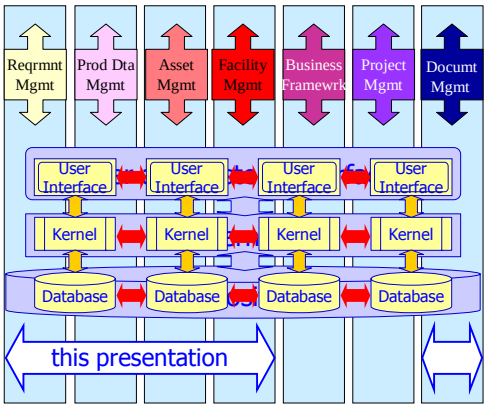
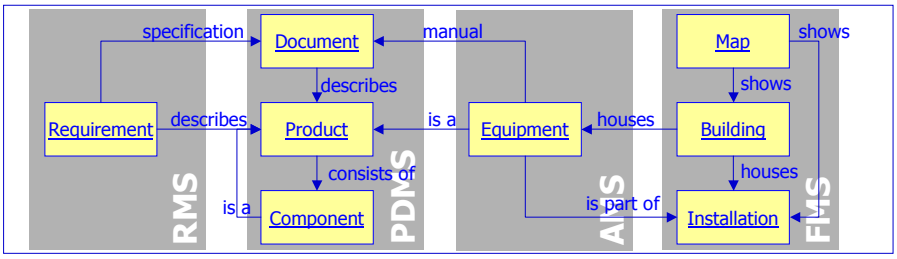


- provide optimum systems for each life cycle stage
  - vertical systems for RM, PDM, AM, FM, ...
  - horizontal components for interfaces, business objects, data repository, reporting ...
- provide integrated solution
  - connect systems at UI level
  - connect repositories
  - implement update and synchronization mechanisms

Connecting the Systems

- database schema
  - conceptually defines and relates key objects
  - allocates key objects to different information systems
  - connects information systems by object relations
- no generic integration method known in computer science



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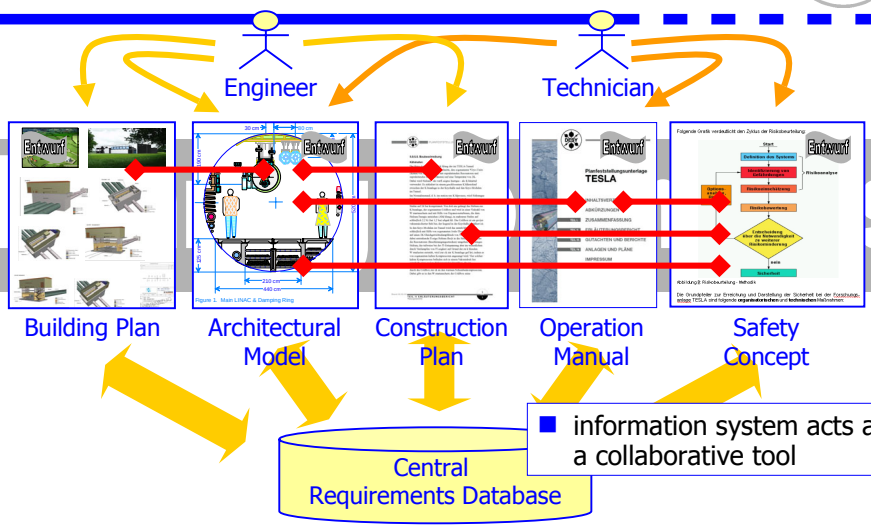
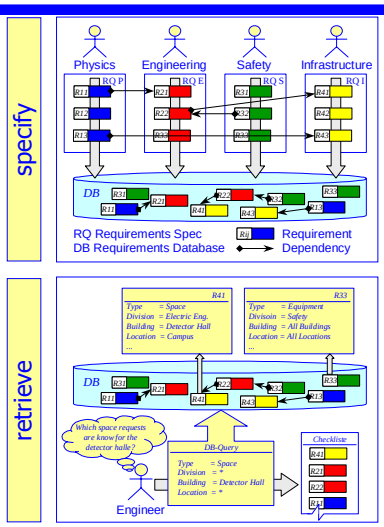
An RMS for TESLA Planning



- information system acts as a collaborative tool

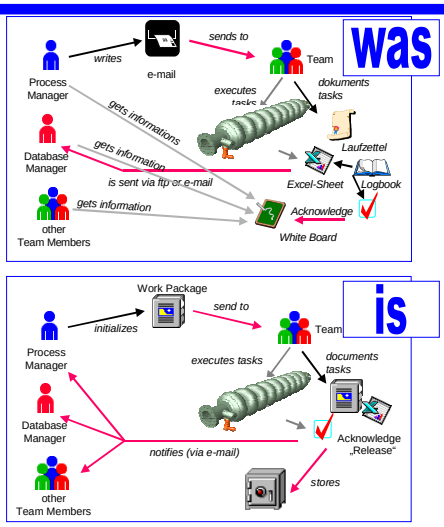
The RMS Solution



- demand for an RMS
  - distributed working groups independently work on specification
  - facilities and components depend on each other at technical level
- based on commercial product
  - in production sind Q3/2002
- specify requirements with office tool
- paragraphs from specifications are mirrored by database and classified by keywords
- Web-based database queries enable information retrieval across team boundaries

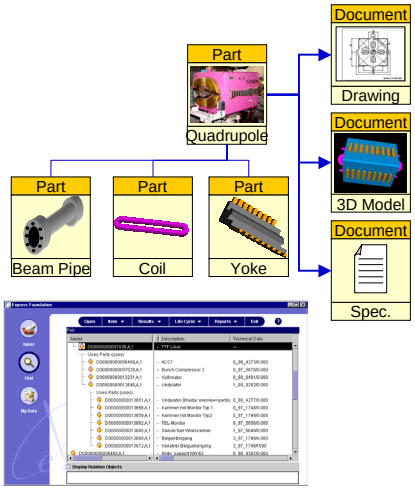
Please visit poster P47
„The TESLA Requirements Database"

An PDMS for TTF-2



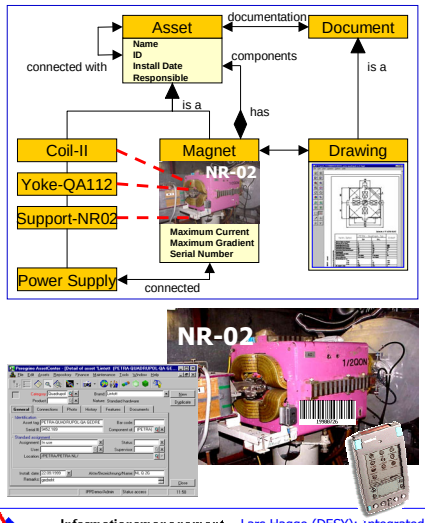
- demand for a PDMS
  - components are developed and manufactured at different sites
  - ongoing research in cavity processing
  - operation and maintenance for more than a decade
- based on a commercial product
  - in production since Q2/2002
- improved cavity preparation process by PDMS
  - coordination of work packages by workflow engine
  - optimization of work flow
  - transparency and history

A PDMS for TTF-2 (2)



- users create part structures for components under development
  - part-to-part relations for building part breakdown structure (PBS)
- documents attached to parts, e.g.
  - CAD models
  - drawings
  - work packages
  - general documentation
- integration with Office and CAD systems
- workflow engine coordinates approval procedures
- Web-based information access
  - viewing, modifying, releasing ...

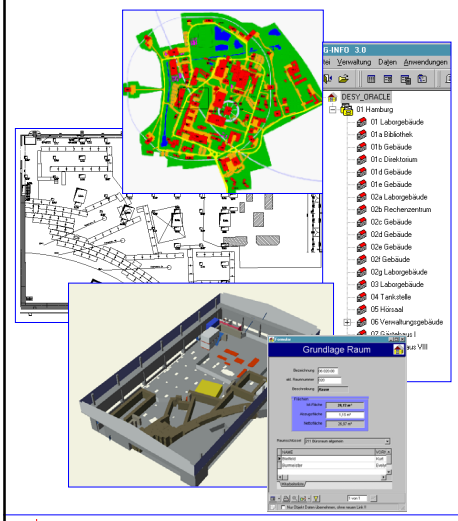
An AMS for PETRA and HERA



- demand for an AMS
  - maintenance processes require single point of information access
  - spare parts management gains importance for ageing accelerators
- based on commercial product
  - tests in current HERA shutdown
- central repository for equipment
  - individual components
- Web-based information access
- workflow engine supports purchasing and MAC procedures

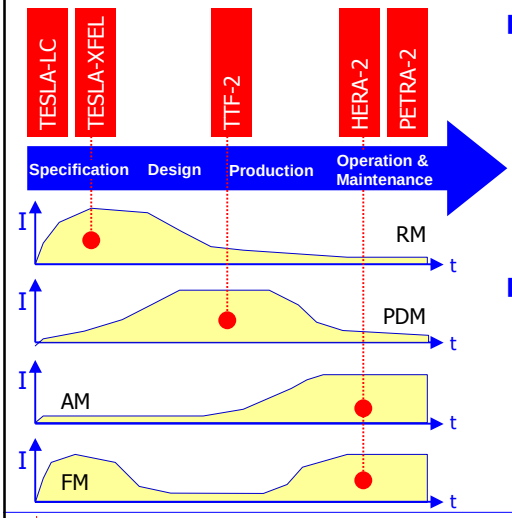
Please visit the presentation „Experience with an IT Asset Mgmt System“ ***Tuesday 2 pm, Category 3***

An FMS for „the Campus"



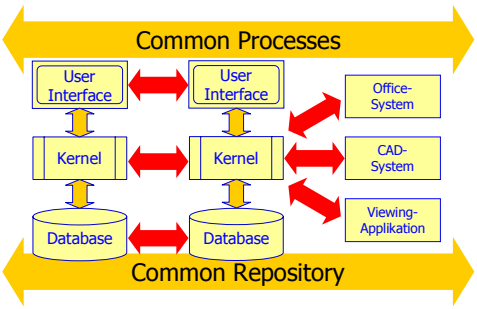
- demand for FMS and GIS
  - projected accelerators initiate civil engineering
  - integrate civil engineering, accelerator development and design and installation of technical infrastructure
- based on commercial products
- architectural CAD system
  - different groups use different layers of common plans
- facility mgmt database
  - online connection of CAD and database objects
- geographic information system

Information Management Revisited



- different information systems
  - introduction of applications and processes
  - for different accelerators
  - which are at different life cycle stages
- start from selected and small applications
  - add user groups to extend functionality of each system
  - connect systems

Connecting the Systems



- conceptual integration
  - define common processes
  - define common schema
- technical integration
  - propagate transactions
  - connect user interfaces
  - connect database schemas

Please visit poster P37 „Concepts for Integrating Information Systems"

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Status

- most systems are up and running
  - last system scheduled Q3 / 2003
- parallel introduction for different accelerators
  - system introduction requires accelerator project in corresponding stage of life cycle
  - harder to integrate systems for lack of common objects
- initial integration efforts were started

Benefits

- enabler for concurrent engineering
  - independent distributed working groups
  - integrate accelerator design, civil engineering, technical infrastructure etc.
  - process and quality improvements (e.g. in cavity prep.)
- central communication / documentation platform
  - integrates heterogeneous environs. (Office, CAx ...)
  - structured access to up-to-date information
  - available to all the participants
- long term archiving of emerging knowledge
  - documents and information in native formats

Experience

- major success factors include use, usability and extensive user support in method and tools
  - respect the community's working model
- information management requires long advance planning
  - importance slowly, but increasingly visible & recognized
    - improved cavity preparation because of PDMS
    - better transparency in TESLA planning because of RMS
- integration is a difficult project of its own
  - conceptual integration work has to start very early