Tecnomatix Manufacturing Planning Solutions

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Agenda

- The Complexity of Digital Manufacturing
- MPS Product & Solution Portfolio
- Teamcenter Integration – Vision & Roadmap
- Summary
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Tecnomatix Manufacturing
Process Design Complexity
Tecnomatix Manufacturing
Manufacturing Data Complexity

Engineering

Manufacturing

10 - 100x MORE DATA
Tecnomatix Manufacturing
Resulting Needs

**Pains**

- Disconnected Product and Process data disables tracking of Eng. Change effects
- Lack of upfront Mfg. process validation causes launch of non-optimized processes
- Eng. Efforts are wasted on data retrieval and entry into dispersed Mfg. data sources
- Globally spread teams with limited collaborative environment causes waste of waiting time

**Needs**

- Ability to track Eng. Changes and assess their effect on Mfg. processes
- Ability to analyze, validate and optimize processes upfront
- Ability to define, manage and reuse validated, best-in-class processes
- Ability to standardize processes, resources and methods
- Ability to collaborate with global teams
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Process Designer

- Process Designer allows manufacturing engineers to author manufacturing processes in a 2D & 3D graphics environment
- Process Designer provides the ability to build a 3D virtual model of an eBOP (electronic Bill of Process)
- Combining an easy to use planning environment, and powerful graphics engine of the advanced engineering applications, Process Designer provides complete workflows for quick and accurate manufacturing planning
Process Simulate

- Advanced 3D Simulation environment for process authoring
- Plan, create and document of manufacturing process in 3D dynamic environment
- Analyze and verify the process
- Dynamic visualization of the process by simulation
- Integrated to the manufacturing backbone data repository
Deliver Industry based solutions

**Value chain**

**Applications**

### Industry focused solutions

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<th>Automotive</th>
<th>High Tech &amp; Electronics</th>
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Production Proven...Beyond Proof of Concept

Audi & 6 suppliers standardizing and reusing processes

Ford, Lincoln, Mercury, Jaguar, Volvo & Land Rover reducing costs, improving efficiency and flexibility

Improving process quality time and reliability

Reducing development time by 25% and changes by 75%

GM & 9 suppliers collaborative process planning

Manufacturability analysis to support outsourcing

Process design standardization to support integrated quality plan initiative

Assure manufacturing compliance to regulatory directives

Support concurrent engineering efforts, accelerate ramp, reduce cost of changes

...and Many others!
The Complexity of Digital Manufacturing

MPS Product & Solution Portfolio

Teamcenter Integration – Vision & Roadmap

Summary
End State Vision – Integration Principles

- One system, best of both worlds with single look and feel
- Enhance the existing Teamcenter PLM backbone to better support manufacturing capabilities
- For TCM customers:
  - *Tecnomatix planning and simulation functions become Teamcenter-based functions in a single environment*
- For Tecnomatix customers:
  - *benefits from Teamcenter enhancements e.g. Rich Application Client framework, extended process model and powerful data management capabilities*
- For new customers
  - *an industry-based integrated solution (BiW, Assembly, Aerospace, Machining) supported by the integration roadmap*
Combining Powers of eMServer and Teamcenter Solution

- **eMServer Applications**
  - High fitness to existing methodologies of various BMW departments (FA, PT, BIW, Components, Material-Flow/Logistics)

- **Teamcenter Data Management**
  - High level support of advanced enterprise and serial-life needs (e.g. central data repository, vaulting, effectivity, change management, permission management…)

- **Teamcenter Manufacturing Backbone**
  - Integration of best practices of both eMServer and Teamcenter into a strong unified offering
Integration of Process Designer and Process Simulate to Teamcenter utilizing Collaboration Context

- Accessing tools and equipment through Teamcenter Resource Browser from Process Designer
- Support for JT in Process Designer and Simulate

Utilize Teamcenter as the enterprise-wide repository for product and resource data
Utilize JT through-out the digital lifecycle including DM
- Process Simulate fully integrated with Teamcenter / one database

- Use Teamcenter as the single data repository for planning and simulation documents

- Support all kinds of kinematic devices in JT

Allow for product and resource validation with Teamcenter using expert-level manufacturing simulation

Reduce data acquisition time for manufacturing simulation
Factory Planning & Optimization Vision

- Integrated solution for planning and optimization of factories
- Combine capabilities of Process Designer Logistics, FactoryFlow, FactoryCAD and Plant Simulation
- Leverage Teamcenter data management capabilities for plant and simulation data sets

Create factory models faster & ensure they operate at peak efficiency before production ramp-up
- Integrate FactoryCAD and Plant Simulation
- Model a factory in FactoryCAD and execute bottleneck or through-put analysis in an easy way
- Modify simulation relevant parameters from within FactoryCAD
- Send simulation model to FactoryCAD and detail the layout there

Re-use of data between Factory Planning and Plant Simulation departments
Reduced data acquisition for creation of simulation models and/or factory models
Factory Planning – 2006 Roadmap

**ICE**
- Send selected data from Teamcenter directly to AutoCAD or FactoryCAD
- Load multiple drawings from different Teamcenter nodes into one AutoCAD/FactoryCAD session
- Supports “Disconnected from Tc” methodology

**FIRM**
- Access resources from Teamcenter via the Resource Manager in FactoryCAD
- Ability to classify AutoCAD blocks or smart factory objects as Teamcenter resources

Reduced effort for data preparation in AutoCAD/FactoryCAD
Same view on the data in AutoCAD/FactoryCAD and Teamcenter
Human Simulation Vision

- Integration to Teamcenter Manufacturing Backbone
- Using incremental Jack functionality in the Process Simulate Human Advanced environment
- Seamless integration of in-depth ergonomic analysis into planning work
- Combine strong Generic Ergonomic Reporting, in-depth ergonomic analysis and database management system
- Support of broad VR hardware

Easier and faster modeling of manual manufacturing processes
More precise assessment of workplace ergonomics
Human Simulation – 2006 Roadmap

- First phase of Jack integration into Process Simulate
- Static analysis of human tasks using Jack
- Utilize Jack model in context with other Process Simulate capabilities

Choice of two advanced anthropometric models in one environment
Complete manufacturing simulation environment for Jack users
Deliver Value Applications – 2006 Deliverables

- Time-Way-Plan
- Line Balancing
- Gantt – Resource utilization analysis
- Planning BOM
- Teamcenter CC/MSE Usability
- Robotics
- Teamcenter Publish
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- Best-in-class planning & simulation technologies integrated into a Teamcenter based solution set
- Industry and domain knowledge focused on Digital Manufacturing enable building value solutions
- Full integration of Tecnomatix into UGS product landscape
  - Product portfolio
  - Product strategy
  - Product organization