PTC to Acquire Mathsoft Engineering & Education, Inc.
Predictive Engineering Solution Broadens CAE Offerings
April 26, 2006
Safe Harbor Statement

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PTC to acquire Mathsoft Engineering & Education, Inc., a leading provider of solutions for creating and managing engineering calculations, for $63.3M

- ~250,000 professionals throughout the world in key industries rely on Mathsoft solutions, including:
  - Aerospace & Defense
  - Electronics & High Tech
  - Discrete manufacturing
  - Architecture, Engineering & Construction
- Over 2,000 universities use Mathsoft solutions as a core component of the math, science & engineering curriculum
- Mathsoft develops XML-based engineering calculation solutions that protect engineering innovation, investments and intellectual capital while improving organizational efficiency and productivity
- Mathsoft is privately held, headquartered in Cambridge, MA, with 130 employees in 7 countries; Annual Revenue: ~ $20M

With this acquisition, PTC is uniquely positioned to deliver predictive engineering capabilities for authoring, documenting, and managing calculations driving product designs.
Mathsoft Fits PTC’s Acquisition Strategy

Financial Fit

- Helps PTC achieve financial goals of revenue of $1B and non-GAAP operating income of $200M by 2008:
  - Accelerates PTC’s growth opportunity: CAE is one of the faster-growing segments within PLM and Mathsoft is growing 15-20%
  - Slightly dilutive in 2006; accretive to operating margin and EPS in 2007 through both cost synergies and revenue leverage
  - Revenue is derived primarily from software and maintenance, improving our overall revenue mix with higher-margin revenue sources.

Strategic Fit

- Adds value for PTC:
  - Natural extension of PTC’s Product Development System: enables discrete manufacturing customers to achieve an optimized product design faster
  - Deepens and differentiates PTC’s CAD, CAE, and PDS offerings
  - Expands PTC’s footprint into additional industries
  - Extends PTC’s high volume marketing, sales & distribution capabilities

- Adds value for Mathsoft:
  - Leverages PTC’s global distribution and support channel to enhance Mathsoft’s sales and customer support
  - Mathsoft customers can benefit from the tight integration with PTC solutions, driving process efficiencies previously unattainable
Role of Mathcad in Product Development

"Engineering calculations are the crown jewel of any product development organization ….. manufacturers have realized that these calculations are critical intellectual property that must be propagated beyond an individual engineer’s desktop to be shared, reused and reported."

Monica Schnitger, senior vice president of market analysis at research firm Daratech Inc.
Market Drivers: Opportunity for Value

Traditional engineering methods are outdated

- Physical handbooks remain an important tool for estimating, validating, and early sizing
- Calculators, spreadsheets, programming languages and paper notebooks are used to document engineering calculations
- Typically, this knowledge is lost, not easily understood by others, or locked up in the physical item

Too many iterations

- Intuition/experience combined with multiple CAE and/or physical prototype iterations are used in lieu of formal calculations, resulting in a lengthy and inefficient design process

Aging engineering workforce

- Engineering knowledge, institutional knowledge, and the reasoning behind many engineering decisions is lost

As companies globalize, institutional knowledge is lost and best practices are abandoned

- Formalizing and documenting usage of engineering calculations is necessary to institutionalize best practices

Regulatory compliance

- Many companies are required to fully document the engineering work that goes into their products
- Current methods of documentation make these submissions, are time consuming to prepare and delay time to market, and leave organizations at risk
Current Engineering Calculation Methods are Problematic

Handbook methods remain an important tool for estimating, validating, and early sizing, but are disconnected from development process.

Spreadsheet Methods Pose Significant Challenges:
- Live calculation but formulae hard to read
- No “units” management
- Auditing difficult
- No support for advanced math calculations
  - Calculus
  - Differential equations
Mathcad Value Proposition

Automates Process
- Repeatable & auditable
  - Standard calculations
  - Proprietary calculations
- Live calculation
- Automatic “units” management

Communicates Engineering Knowledge
- Human readable calculations
- XML format enables automated publishing in downstream docs

Ensures Traceability
- Can connect
  - Calculations to design geometry
  - Results to customers

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**Given Parameters**

- Shaft lengths:
  - Lin := 260 mm
  - Lout := 240 mm

- Shaft weights:
  - Win := 1.854 × 10⁻⁵ tonne
  - Wout := 1.854 × 10⁻⁵ tonne

- Shaft rpm:
  - Rm := 500 rev/min
  - rev = 1

---

**Calculation Procedure**

1. Compute the gear load
   Calculating torque, we get
   \[ T_{in} = \frac{\text{shp}}{Rm \cdot 2\pi} \]
   \[ T_{in} = 28992 \text{ lb} \cdot \text{in} \]

Output speed is
   \[ R_{out} := \frac{\text{driven}}{\text{drive}} \]
   \[ R_{out} = 1453.39 \text{ rev/min} \]
Many Touchpoints For Mathsoft Products:

- **Pro/ENGINEER**
  - Mathcad calculations can drive design model
  - Design model can drive Mathcad calculation
  - Mathcad provides a tool for knowledge capture during design
- **CAE**
  - Predict model behavior with Mathcad, validate using Pro/ENGINEER Mechanica
  - Reduce the number if iterations
- **Windchill**
  - XML-based Mathcad documents can be captured, cross-referenced, configuration controlled, and reused
- **Arbortext**
  - Technical documents are enriched and deliver greater value when they include Arbortext authored text, Pro/ENGINEER derived images, and related Mathcad calculations
### Calculations are Fundamental to Businesses in Many Industries

<table>
<thead>
<tr>
<th>Civil Engineering</th>
<th>Oil &amp; Gas</th>
<th>Power Generation</th>
<th>Process Industries</th>
<th>Government</th>
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<tr>
<td>CH2M Hill</td>
<td>Schlumberger</td>
<td>Sargent &amp; Lundy</td>
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<td>URS</td>
<td>Hyundai Heavy</td>
<td>Hydro Quebec</td>
<td>Praxair</td>
<td>Department of Defense</td>
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### Transportation
- Pipeline Design
- Platform Development
- Offshore Exploration
- Basin Modeling
- Gas to Liquid Processing
- Gas, Steam, Electric & Nuclear power plant design
- Corrective & Preventive maintenance
- Power Distribution
- Generator Design
- Gas to Liquid Processing

### Civil Engineering
- Aircraft Engine Design
- Weapon Systems Analysis
- Bridge & Highway Development
- Nuclear Research
- Energy Surety
- Defense Analysis

### Waste Water Management
- Regulatory Compliance
- Drug Discovery
- Facilities Design
- Product Innovation
- Medical Packaging
- Plastics Manufacturing

### Environmental Engineering
- Corrective & Preventive maintenance
- Power Distribution
- Generator Design
- Gas, Steam, Electric & Nuclear power plant design

### Plant & Building Construction
- Offshore Exploration
- Basin Modeling
- Gas to Liquid Processing

### Maintenance Operations
- Corrective & Preventive maintenance
- Power Distribution
- Generator Design
- Gas, Steam, Electric & Nuclear power plant design

### Pipeline Design
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### Regulatory Compliance
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- Drug Discovery
- Facilities Design
- Product Innovation
- Medical Packaging
- Plastics Manufacturing
PTC is Uniquely Positioned to Deliver Predictive Engineering Capabilities

- Current engineering calculation practices put company knowledge at risk.
- Mathsoft solutions revolutionize the way engineers create and document critical engineering knowledge.
- Mathcad differentiates and broadens PTC’s CAE offerings with unique predictive engineering capabilities.
- Mathcad extends the value of PTC’s PDS enabling companies to create, document, manage, and leverage engineering calculations throughout their product development process.
- PTC extends the value of Mathsoft solutions and is committed to serving all of the industries Mathsoft has served to date.
- PTC’s strategy is to remain open and work with a variety of information sources, content management solutions and other enterprise applications.
PTC Delivers Industry’s First Integral Solution for Technical Publications

Windchill – Arbortext Integration Released
PTC Introduces Industry’s First Integral Solution for Technical Publications

Manufacturing companies are prolific technical publishers, but the process is riddled with inefficiencies

Leads to slowly produced, ineffective publications, resulting in:
- Customer dissatisfaction
- Missed Market/Revenue Opportunities
- Wasted time/effort
- Increased liability/risk

With the release of the Windchill-Arbortext integration, PTC is introducing an industry first

- The PTC Product Development System helps companies deliver critical documents, enabling faster and more effective communications to customers and colleagues
- PTC’s deployment reduces risk and total cost of ownership while ensuring realized value
PTC’s Content Management Focus

Focuses on:

…Componentized and structured content

…That has been created via a complex process

…Subject to frequent changes

…Requiring dynamic configuration and publishing

…Across multiple types of media

…As appropriate for different audiences

…To match products, processes, or services
PTC’s Integral Solution for Technical Publications

**CREATE**

- **Arbortext Editor**
  Creates Text Components

- **Mathcad**
  Creates engineering calculations
  \[ T_{in} = \frac{\text{rpm}}{\text{rpm} \cdot \pi} \]
  \[ T_{in} = 28992 \text{ lbft/in} \]

- **Pro/ENGINEER**
  Creates 2D/3D Components

- **Other Authoring Tools**

**COLLABORATE & CONTROL**

- **Windchill ProjectLink**
  Enables Collaborative Development Projects

- **Windchill PDMLink**
  Provides Content and Process Management

  & Manages BOMs and Product Configuration

**COMMUNICATE**

- **Arbortext Publishing Engine**
  Automatically Assembles Components and Publishes Product Documentation for Downstream Audiences

- **ProductView**
  and **InterComm**
  Provide Interactive Visualization of Embedded MCAD and ECAD data

- **Engineering Specs**
- **User/Training Manuals**
- **Manufacturing Docs**
- **Regulatory Docs**
- **Maintenance Docs**
- **Marketing Materials**
- **Product Catalogs**
Windchill - Arbortext Integration: Key Capabilities

Windchill 8.0 Integration with Arbortext Editor

- Single user environment for authoring and managing publication information
- Provide collaborative authoring of publications
- Integrated with product development processes

Windchill 8.0 Integration with Arbortext Publishing Engine

- Publications automatically generated based on business processes
- Published documents managed with Windchill PDMLink
- Graphical content within publications
## Benefits

<table>
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<tr>
<th>Higher quality, more relevant content</th>
<th>Higher customer satisfaction, better market acceptance</th>
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<tbody>
<tr>
<td>Timely and accurate documentation and regulatory submissions</td>
<td>Improves compliance and reduces legal liability and risk</td>
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<tr>
<td>Ability to ship complete product, including documentation, earlier, simultaneously in all languages</td>
<td>Speeds market entry, improves market share, and accelerates revenue recognition</td>
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<td>Single repository for all product content</td>
<td>Faster time-to-market with increased quality, lower development costs</td>
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<tr>
<td>Improved internal service productivity</td>
<td>Reduction in labor cost</td>
</tr>
<tr>
<td>Improved ability to reuse data and enhanced content accuracy</td>
<td>Less time spent performing low-value tasks and doing rework</td>
</tr>
<tr>
<td>Single solution provider validating application &amp; system reliability</td>
<td>Less down time, greater productivity, lower IT burden, and lower total cost of ownership</td>
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Customers’ Reaction

“In our line of work, product quality is of unsurpassed importance.”

“We think that this integration will allow us to deliver technical documentation that will conform to the exacting guidelines required for activities like the SS21 (Seamless Safety for the 21st century) program compliance, our model based capability implementation and others.”

“We also expect to see productivity gains from moving our tedious manual process to an automated electronic one. Moreover, the combination of Arbortext and Windchill will easily allow our documentation requirements to adapt to the necessary and continual updates.”

We are anxiously looking forward to deploying this solution.”

Chuck Oien, Deputy Director, Information Technologies, Sandia National Laboratory