Engineering and Plant Information, Automation and Data Management
Summary of Services – CAE Technologies Inc.

CAE Technologies, Inc. is a Calgary, AB, Canada based specialized provider of "fit-for-purpose" Engineering and Plant Information Management Solutions and Web and Mobile Development organization with a focus to enable asset data integrity and improve Life Cycle Asset Management in Oil and Gas, Mining, Power Generation and Construction Industries.

Through its partnership with proven local industry consultants and offshore Digital Design and Information Technology companies in India, CAE can deliver complete CAD Drafting and Conversions, Data Services and repetitive data management tasks in a cost-effective and timely manner that provide outstanding value by applying innovative approaches, skilled personnel, and disciplined processes.

<table>
<thead>
<tr>
<th>Engineering and Plant Information Management Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ACAD, MicroStation <strong>Drafting</strong> Services</td>
</tr>
<tr>
<td>• Master Data Management (<strong>MDM</strong>)</td>
</tr>
<tr>
<td>• Enterprise Asset Management (<strong>EAM</strong>)</td>
</tr>
<tr>
<td>• Engineering / <strong>MRO</strong> Services</td>
</tr>
<tr>
<td>• <strong>Data</strong> Services (Audit, Classification, Cleansing and Enrichment)</td>
</tr>
<tr>
<td>• <strong>BIM</strong> Services - Modeling, Coordination, integration (3D,4D,5D,6D), Documentation and Implementation</td>
</tr>
<tr>
<td>• Laser Scanning and <strong>Point Cloud</strong> Data Processing</td>
</tr>
<tr>
<td>• 3D Model Development from Point Cloud Data (<strong>As-Built Services</strong>)</td>
</tr>
<tr>
<td>• <strong>CAD Conversions and Systems Management (AVEVA, Intergraph, Bentley, Autodesk)</strong></td>
</tr>
<tr>
<td>• Plant Design Automation</td>
</tr>
<tr>
<td>• Procurement and SCM</td>
</tr>
<tr>
<td>• Inspection and Expediting</td>
</tr>
<tr>
<td>• Custom Application Development</td>
</tr>
<tr>
<td>• Mobile application development</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consulting Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SPP&amp;ID Configuration / Conversion / Publishing</td>
</tr>
<tr>
<td>• S3D Customization / Spec &amp; Symbol creation / Model Data Conversion / Piping Material Class Generation (Automation)</td>
</tr>
<tr>
<td>• SmartPlant Instrument &amp; Electrical Configuration / Conversion /Publishing</td>
</tr>
<tr>
<td>• SPF Configuration &amp; Integration with different SmartPlant tool data.</td>
</tr>
<tr>
<td>• SPO Implementations with Integration &amp; Data loading.</td>
</tr>
<tr>
<td>• PDS2D, PDS3D</td>
</tr>
<tr>
<td>• Isometrics configuration</td>
</tr>
<tr>
<td>• System Configuration CAD</td>
</tr>
<tr>
<td>• <strong>Solidworks 3D</strong> Modeling, Advanced surface modeling, Mold design, Simulation, Solidworks API, drafting and sheet metal</td>
</tr>
<tr>
<td>• <strong>Siemens NX 3D</strong> Modeling, Advanced surface modeling, drafting</td>
</tr>
<tr>
<td>• AVEVA E3D / PDMS, AVEVA Diagram, AVEVA Electrical, AVEVA Engineering, AVEVA Instrumentation, AVEVA P&amp;ID, AVEVA Catalog Mgr, AVEVA NET</td>
</tr>
</tbody>
</table>

**Geospatial Solutions**

| Consulting |
| Solutions Engineering |
| Data Engineering |
| Photogrammetry |
Master Data Management (MDM)

**Data Classification**

- Global taxonomy systems, including: UNSPSC | eCl@ss | eOTD | NAICS | SIC | SMD
- Customer defined taxonomies
- Parameters for effective spend analysis:
  - Vendor master cleaning | State / Region / Province and country codes | Supplier de-duplication

**Data Cleansing**

- **Data Normalization**
  - Identification of duplicates
  - Expansion of abbreviations
  - Removal of extraneous characters
  - Removal of spell mistakes
- **Data Rationalization**
  - Identification of Noun-Modifiers
  - Ordering the product description in the format of “Noun, Modifier, and Parameters”
  - Extraction of attribute values from input data
- **Data Standardization**
  - Identification of inconsistent entities and make them uniform.

**UNSPSC based spend analytics**

- UNSPSC based Spend Analytics on the transactional data extracted from business systems
- Creation of standard and customized spend reports

**Inventory Optimization**

- To identify and reduce inventory and inventory driven costs across client’s supply and distribution networks
- Application of rigorous and discrete analysis to analyzing inventory performance
- Recommend changes to inventory stocking and replenishment policies

**BOM / SPIR Data mining**

- To generate the BOM for individual maintenance task by referring to the Task List, Drawings, Manual and other documents made available. A well constructed BOM helps to reduce the equipment down time
- To identify and segregate identical spares in the catalogue and cross refer them to create a spares interchangeability report
Enterprise Asset Management (EAM)

Industry Challenge
- Plants are not able to fully utilize their CMMS (computerized maintenance management systems) applications
- Growing backlog of un-posted work orders into their CMMS
- Timeliness and accuracy of this data is a critical requirement to the cost-justifying applications

Solution

CAE's EAM practice
- First time collection & Posting for Greenfield Projects
- Migration from Legacy to a new gen CMMS or ERP
- Periodical Strategy and Data reviews
- Day to day posting and upkeep

It is the whole life optimal management of physical assets of an organization to maximize the value. CAE caters various services to Organization to achieve this.

Building Asset Registry
Building Hierarchy
Functional I.D. Creation
Spare Part BOM Creation
SPIR Creation
Vendor Master & Service Master Creation
## Tools & Technologies Used for MDM and EAM

<table>
<thead>
<tr>
<th>Function</th>
<th>Technology</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-commerce</td>
<td>ASP.Net, jQuery, C#, MVC, ADO.Net, WCF, SQL Server, SSRS</td>
<td>Application enables the objective of integrating seller &amp; potential buyer</td>
</tr>
<tr>
<td>Logistics ERP</td>
<td>Ext.Net, C#, LINQ, SQL Server</td>
<td>Application enables the user to Plan, Procure, sale all business activities within a logistics organization business context</td>
</tr>
<tr>
<td>Plant walk down</td>
<td>XAML, C#</td>
<td>It enables the user to capture information pertaining to inventory/warehouse walk down processes.</td>
</tr>
<tr>
<td>Unified Operations Portal</td>
<td>ASP.Net, Ext.Net, C#, SQL Server, SSRS</td>
<td>Is an ERP supporting project management, Operation management, HR, Quality &amp; Marketing management</td>
</tr>
<tr>
<td>MDM</td>
<td>Ext.Net, C#, SQL Server, SSIS, SSRS &amp; SSAS</td>
<td>It provides a platform to monitor &amp; controlling data addition, modification &amp; deletion of master data. Master data may pertain to material or customer entity.</td>
</tr>
<tr>
<td>Warehouse</td>
<td>Ext.Net, C#, ADO.Net, Oracle 11g, Google charts</td>
<td>A version of MDM tool intended to build, maintain master data pertaining to warehouse management. It can be readily hooked to any existing ERP applications.</td>
</tr>
</tbody>
</table>

### Verticals

**Engineering (MRO)**
- Oil & Gas
- Mining
- Manufacturing
- Energy
- Automobiles
- CPG / FMCG

**Healthcare**
- Hospitals
- GPOs

**Life Sciences**
- Research Institutes
- Market / Auction sites
## Capability Statement (Intergraph)

### Software Development & Customization
- Design & Development of Smart Plant Data and Catalog Management Solutions
- Design & Development of SmartPlant Data Migration Service Tool
- Design & Development of High-Performance Visual Dashboard System
- Software Customization for SP, SPO, S3D, SPMat
- Programming of parameter-programs
- API and Mobile application development

### Engineering Data Validation & Loading
- Processing, Validating and Cleansing of Plant and Engineering Information
- Creation and Setup of a Centralized Engineering Architecture that could include
  - Design Tools (3D, P&ID, Instrumentation, etc.)
  - Engineering Data Warehouse, Document Management Systems and Maintenance Management Systems
- Loading of Data into appropriate application, database, repository, etc.

### System Administration, Training & Support
- PDS2D
- PDS3D
- SmartPlant P&ID
- SmartPlant Instrumentation
- SmartPlant Electrical
- SmartPlant Isometrics
- Smart 3D
- SmartPlant Foundation (SPF)
- SmartPlant For Owner Operator (SPO)
- SmartPlant Material (SPMat)
- SmartPlant Reference Data (SPRD)

### SmartPlant IT Consulting Services
- Installation & Support for SmartPlant Applications
- Configuration & Integration with different SmartPlant tool data
- Configuration and Creation of Reference Data (SPRD)
- Configuration, Conversion and Publishing of SmartPlant Applications
- Isometrics configuration
- System Configuration CAD
- Installation and configuration of DBMS
- Customization of Pipe Support or Hangers
- Development of drawing templates

### Engineering Data Migration & Conversion
- PDS to Smart 3D
- PDMS to Smart 3D
- MicroStation to SmartPlant P&ID
- AutoCAD to SmartPlant P&ID
- PDF/Paper to SmartPlant P&ID
- Piping Line Class Conversion
- Symbol Converter
- As Built 2D & 3D
- Data Exchange between Intergraph Smart3D and Caesar II
- Data Exchange between Intergraph Smart3D and GTStruudl / Tekla and SDS/2
- Solidworks 3D Modeling, surface modeling and drafting

### Training
- PDS® | FrameWorks® Plus | ISOGEN® | SmartSketch®
- SmartPlant® P&ID | SmartPlant® Instrumentation | SmartPlant® Electrical | SmartPlant® Explorer | Smart® 3D | SmartPlant® Layout | SmartPlant® Materials | SmartPlant® Review | SmartPlant® Spoolgen® | SmartPlant® Markup | SmartPlant® Process Safety | SmartPlant® Foundation | SmartPlant® Reference Data
Capability Statement (AVEVA)

Software Development & Customization
- Design & Development of AVEVA Data and Catalog Management Solutions
- Design & Development of AVEVA Data Migration Service Tool
- Software Configuration and Customization for AVEVA Diagram, Electrical, Engineering, Instrumentation, P&ID, Bocad Steel, Everything3D, PDMS, Catalog Mgr, AVEVA NET

Engineering Data Validation & Loading
- Processing, Validating and Cleansing of Plant and Engineering Information
- Creation and Setup of a Centralized Engineering Architecture that could include
  - Design Tools (3D, P&ID, Instrumentation, Electrical etc.)
  - Engineering Data Warehouse, Document Management Systems and Maintenance Management Systems
- Loading of Data into appropriate application, database, repository, etc.

System Administration, Training & Support
- AVEVA E3D
- AVEVA PDMS
- AVEVA Diagram
- AVEVA Electrical
- AVEVA Engineering
- AVEVA Instrumentation
- AVEVA P&ID
- AVEVA Bocad Steel
- AVEVA Catalog Manager
- AVEVA NET

AVEVA IT Consulting Services
- Installation & Support for AVEVA Applications
- Configuration & Integration with different AVEVA tool data
- Configuration and Creation of Reference Catalog Data
- Isometrics configuration
- System Configuration CAD
- Customization of AVEVA Pipe Supports
- Development of drawing templates

Engineering Data Migration & Conversion
- Smart3D to PDMS / E3D
- PDS to PDMS / E3D
- MicroStation to AVEVA P&ID
- AutoCAD to AVEVA P&ID
- PDF/Paper to AVEVA P&ID
- SPI to AVEVA Instrumentation
- SPEL to AVEVA Electrical
- Piping Line Class Conversion
- As Built 2D & 3D

Training
AVEVA E3D, AVEVA PDMS, AVEVA Diagram, AVEVA Electrical, AVEVA Engineering, AVEVA Instrumentation, AVEVA P&ID, AVEVA Bocad Steel, AVEVA Catalog Manager, AVEVA NET