NEED FOR NEW CDS INTERFACE

- The original CDS software suite was comprised of 10 separate codes which include data reduction software, micromechanics, structural mechanics, progressive failure, environmental analysis, processing science and ballistics.
- Need exists to consolidate codes into one interface for the following reasons:
  - Aid users with more complex analysis features with a better GUI
  - Material databases should be stored within analysis environment
  - Interface from single environment to commercial FEA software
  - Improved deployment, only one software package to manage
  - Single program can be tailored for demos, full access and customized code incorporation

SMART MENU TREE

- CDS v1.2 is driven by a new menu tree interface
- User stores all materials, laminas, laminates, structures, load cases, and material source information.
- User can create, edit, duplicate, delete their own data sets for materials, laminas, laminates, structures etc.
- Menu tree actively analyzes your work to ensure that your analysis does not have incomplete data or errors.

CURRENT CDS CLIENT LIST

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<thead>
<tr>
<th>Materials Database Management &amp; Generation (CDS-MAT, DART, MAT162)</th>
<th>Structural Mechanics</th>
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<td>Thermal Modeling (COMPROSOFT, PIRSA4 CCDS, FEA IMPORT)</td>
<td>Thin Plate Mechanics (CMAP)</td>
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<td>Process/Environment</td>
<td>Thick Section Mechanics (LAM3D, LAM3DNL)</td>
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<td>Cure Kinetics (PIRSA4)</td>
<td>Cylinder Design (CCDS)</td>
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<td>SLS Viscoelastic (PIRSA, COMPROSOFT)</td>
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<td>Quality Development (PIRSA, COMPROSOFT)</td>
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</table>

MATERIAL PROCESSING

- Time based input – Autoclave, Oven, Elevated VARTM Processing
- Dimension Based input – Pultrusion, extrusion, Automated Tape Placement, continuous lamination

http://www.ccm.udel.edu/Tech/CDSindex.html/
CDS: Composite Design Software
Next Generation Interface for Design and Analysis of Composite Structures

(Continued)

**MATERIAL INPUT**
- Material input for CDS includes the following properties:
  - Mechanical Properties, micromechanics input
  - Physical Properties, cost
  - Failure properties, reduced property sets
  - Non-linear properties, MAT162 Property lists

**LAMINATE INPUT**
- Laminate input for CDS includes the following:
  - Material Selection, thickness, angle, ply delta temperature and moisture, and winding tension (for cylinders)
  - Workbench allows for rapid creation of multiple laminates for design studies

**STRESSES/STRAINS**
- Outputs include internal stresses, strains, displacements and factors of safety from mechanical, thermal or moisture loading for thin, thick walled plates or cylinders

**PROGRESSIVE FAILURE**
- Progressive failure using max, stress and strain, Tsai-Wu failure results under multi-axial loading
- Outputs include, failure ply and mode, load-strain plots, property reduction over loading

**EFFECTIVE PROPERTIES**
- Outputs results for:
  - Thin or thick section effective properties
  - Load and Strain Resultants

**STRUCTURES**
- Thin Section Composites
- Thick Walled Cylinders
- Thick Section Composites
- Hybrid Structures

**CDS AVAILABILITY**
- Software available to current Industrial Consortium members, university researchers and collaborating government agencies

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