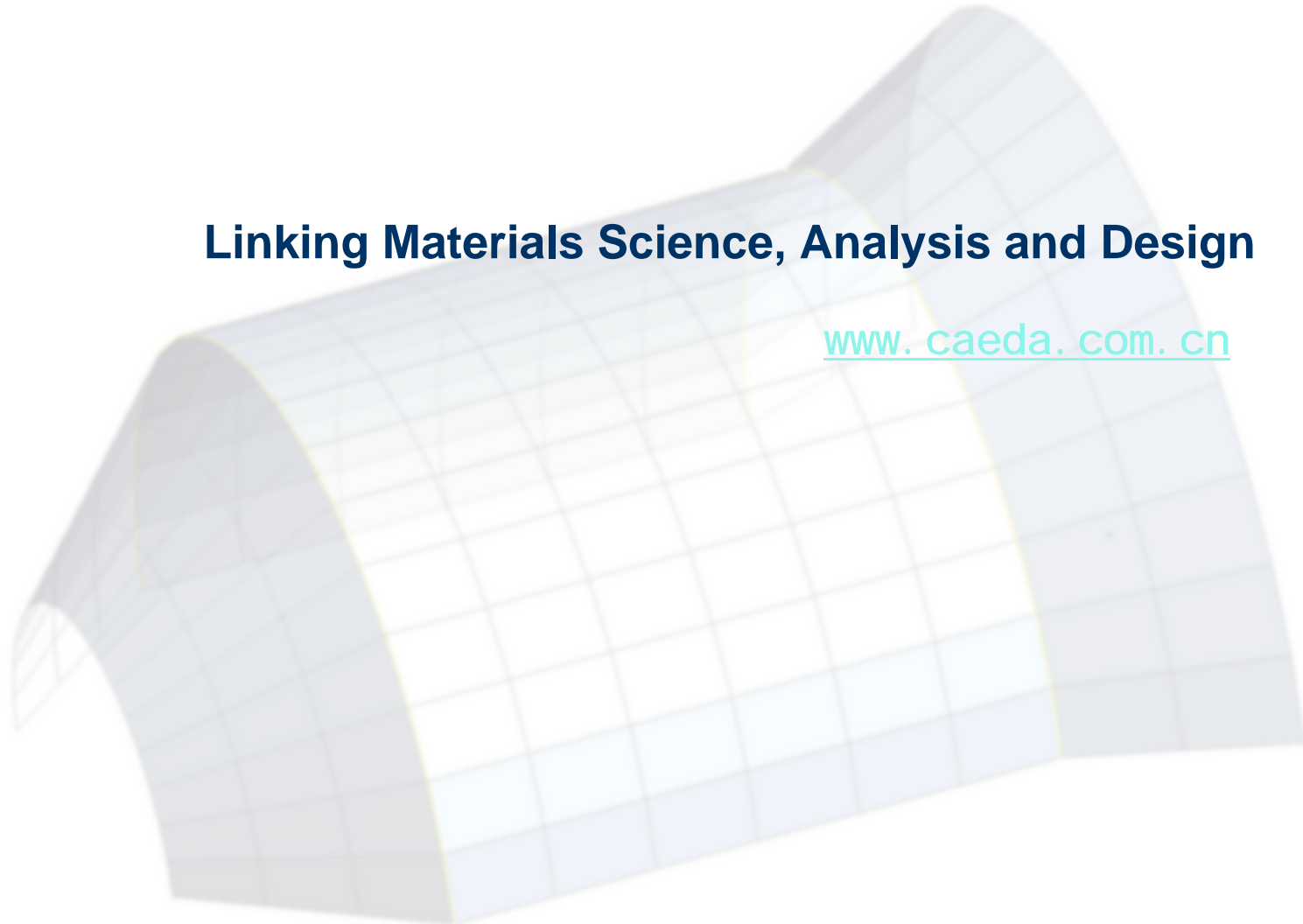
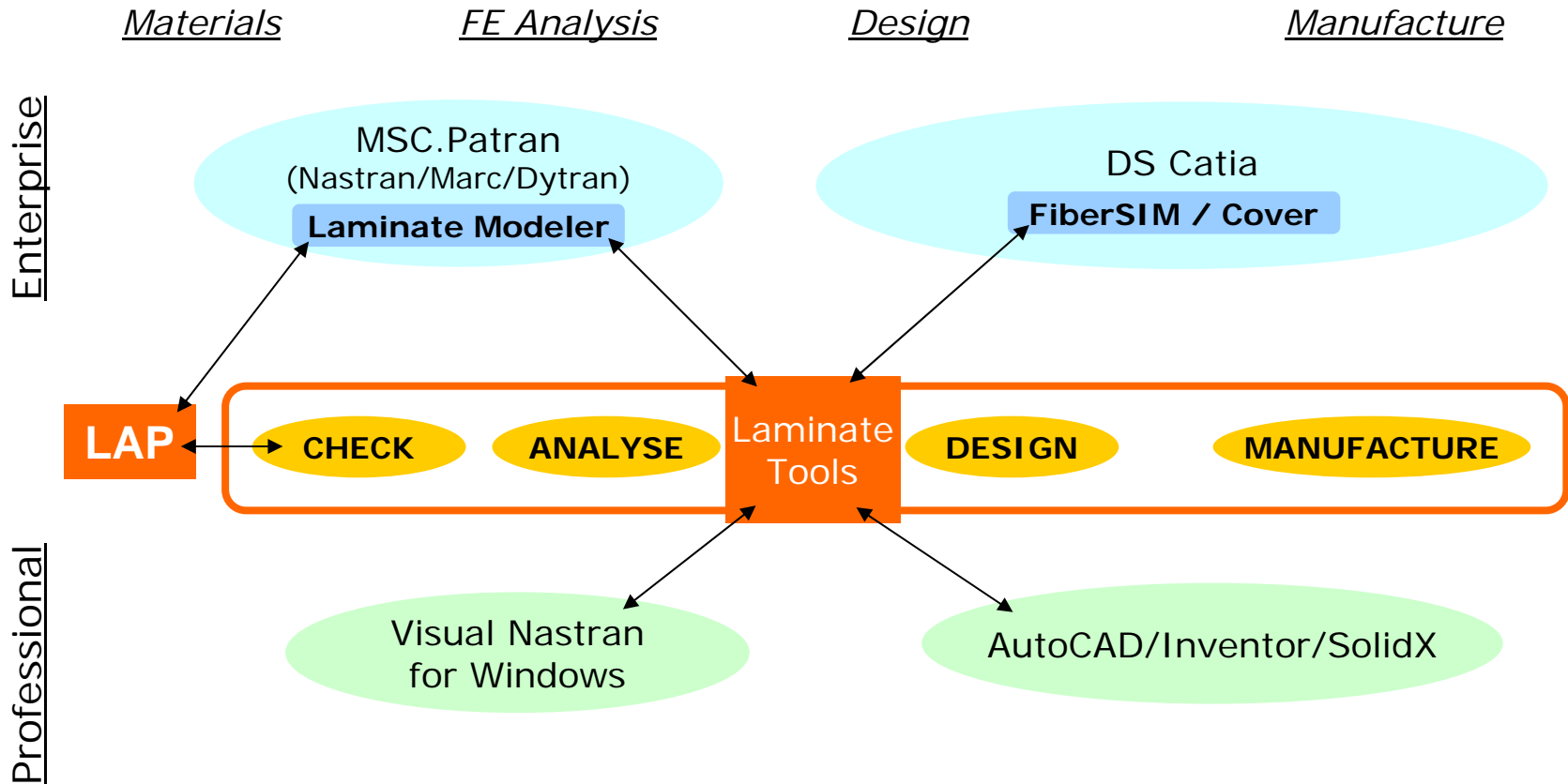


Linking Materials Science, Analysis and Design

www.caeda.com.cn



Workgroup Domains



Laminare Tools :

- focused on laminated composites
- bridges Enterprise and Professional domains
- bridges Materials/ Analysis/ Design/ Manufacture
- Windows based, intuitive familiar interface
- excellent value

LAP

- ✓ **Understand composite material behaviour**
- ✓ **Carry out preliminary design dimensioning and material selection**
- ✓ **Obtain initial lay-up configuration, manually or automatically with the Design module.**
- ✓ **Examine local loads from FE analysis in detail**
- ✓ **Modify, iterate and optimise**
- ✓ **Many features, such as non-linear stiffness properties, custom failure criterion, notched compressive strength, data interfaces**

MSC.Patran – LAP interface

- Laminate information flows in either direction
- Initial laminates passed to MSC.Patran for FE Analysis
- FEA results passed to LAP for detailed analysis

The image displays the MSC.Patran software interface with a finite element analysis (FEA) result. The main window shows a 3D model of a wing-like structure with a color-coded stress distribution. A vertical color scale on the right indicates stress values ranging from 1.98+000 (blue) to 4.09+001 (red). The text in the main window reads: "MSC.Patran 2001 r2a 25-Feb-03 12:21:42" and "Fringe: Default, Static Subcase: Stress Tensor, -Layer 1 (VONM)".

Overlaid on the main window is the "Laminate Analysis Program - Untitled1" window. It contains several sub-windows:

- Untitled1: 1 - Data:** Shows the laminate configuration for "Laminate_4".

Name	Stacking Sequence	Material	Thickness	Angle
Laminate_4	top			
	1	ud_1300_n5208	0.25	0
	2	ud_1300_n5208	0.25	90
	3	ud_1300_n5208	0.25	45
			0.25	45
				30
				45
				90
				90
				45
				45
				90
				90
				45
				45
				90
				90
- Untitled1: 2 - Layer Stress / Strain:** A plot showing the stress distribution across the thickness of the laminate. The x-axis ranges from -100 to 100, and the y-axis represents the laminate top in units of N/mm².
- Untitled1: 3 - Failure Indices:** A plot showing the failure indices across the thickness of the laminate. The x-axis ranges from 0 to 1, and the y-axis represents the laminate top.

On the right side of the MSC.Patran interface, there is a "LAMINATE MODELER" panel with the following settings:

- Action: Export
- Object: Laminate
- Method: LAP
- Select Laminate by: Element
- Select Element: Elm 87
- Select Laminates: Laminating_4
- Export Forces:
- Select Loadcases: Default, Static Subcase_2
- Delete New Coords:
- Spawn LAP:

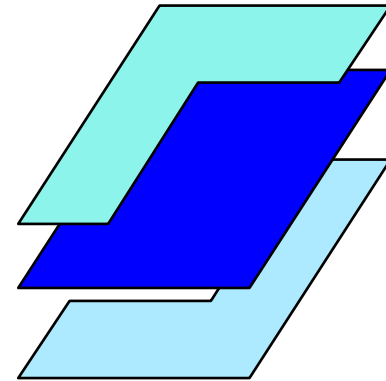
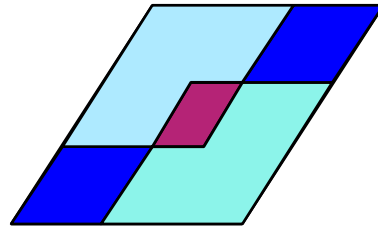
A red arrow points from the "Delete New Coords" checkbox in the LAMINATE MODELER panel to the "Untitled1: 3 - Failure Indices" plot.

Composite Descriptions

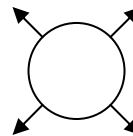
Zones

Plies

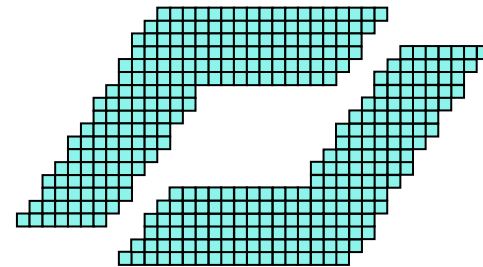
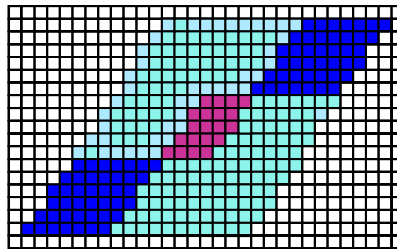
Geometry



NB: Elements may follow ply boundaries for detailed analysis



Mesh

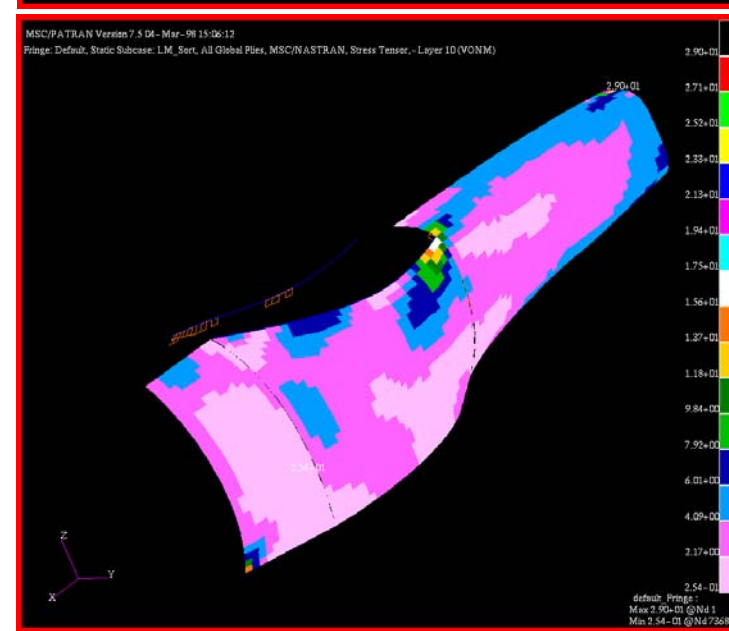
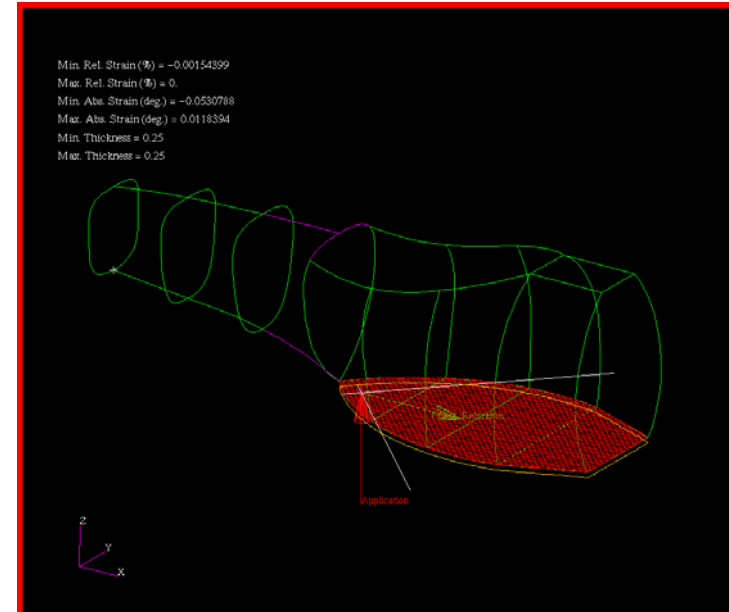
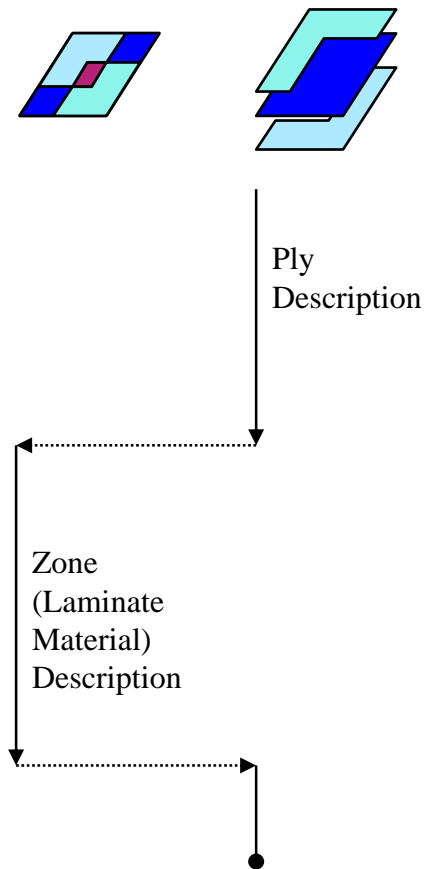


Ply and Zone Modeling

- Create Ply Material
- Create Ply
- Create Layup

- Laminate Materials
- Analysis
- Results
- Failure Calculation

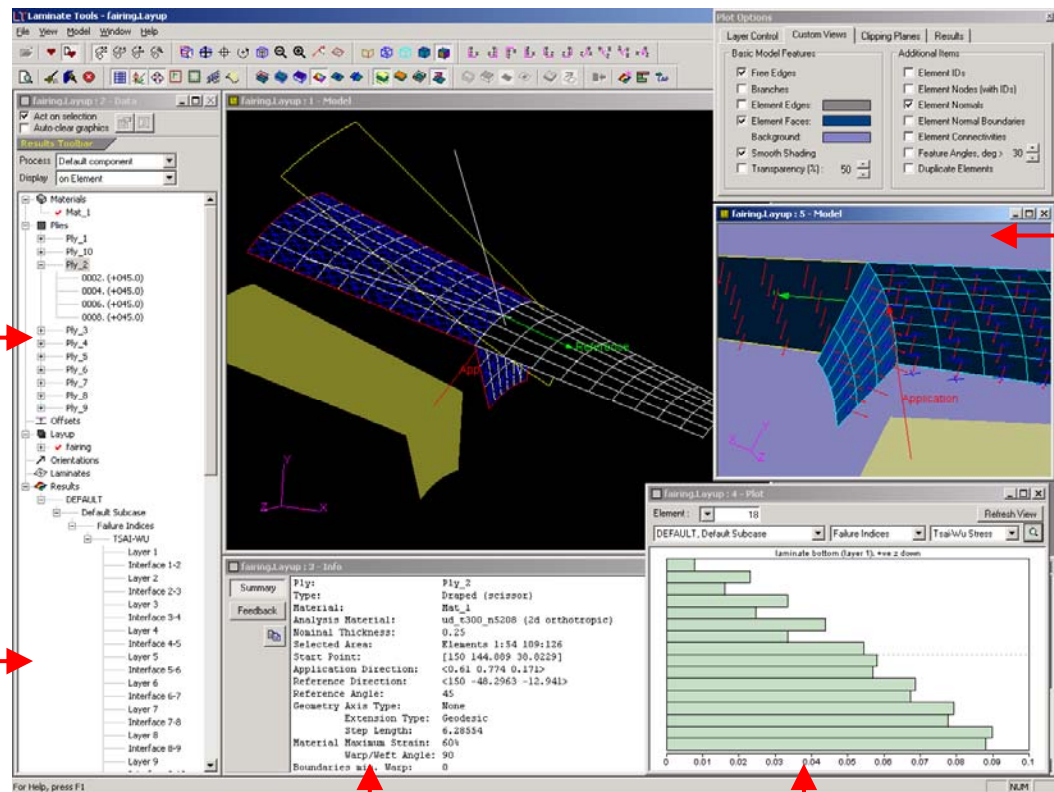
- Results Sort



Laminate Tools – overview

Visualisation – Draping simulation – Pattern generation

MSC.Patran
MSC.Laminate Modeler
.Layup file



Tree View
Shows relationships between materials, plies, layup, laminates, layers, etc.

FEA Results
(imported f06 or op2)

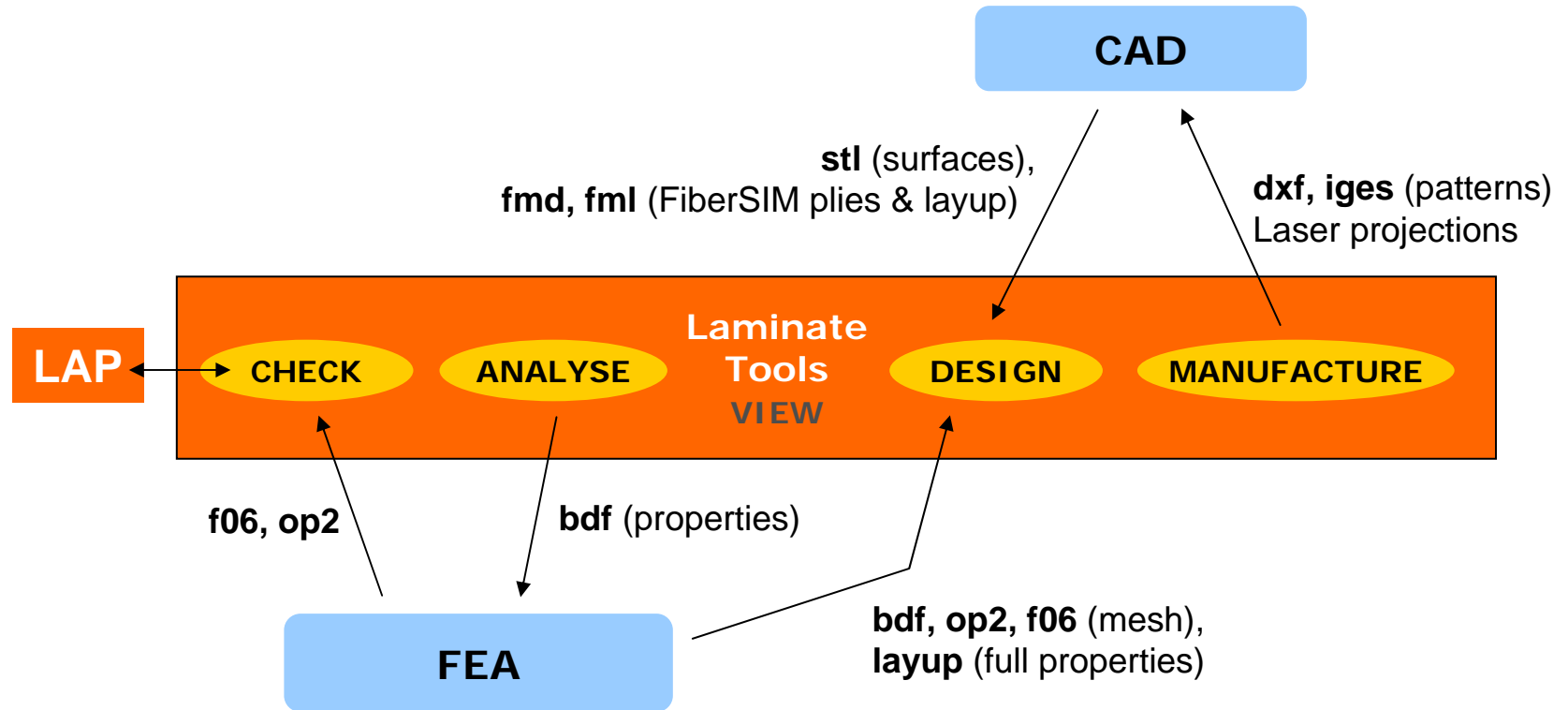
Information window
Gives comprehensive details for the selected entity.

Plot window
Shows layer by layer stress and failure theory results.

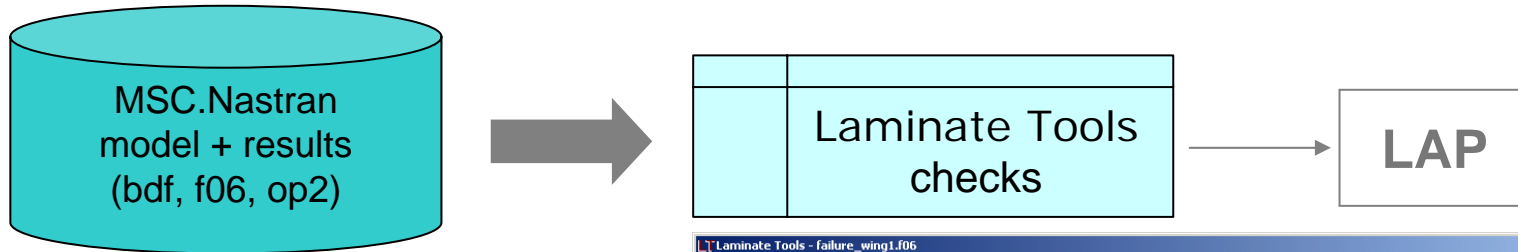
Model views
Multiple views with full control over displayed entities. With support for transparency, clipping, picking, printing, etc.

- Key benefits:**
- ✓ Supports industry standards
 - ✓ Proven draping simulation
 - ✓ Ease of use
 - ✓ Allows effective collaboration
 - ✓ Environment for composites tools
 - ✓ Flexible growth

Laminate Tools – interfaces and modules



Laminate Tools – checking strength



Key benefits:

- ✓ MSC.Nastran results
- ✓ Additional criteria (incl. custom)
- ✓ Stress or Strain basis
- ✓ Multiple Loadcases (enveloping)
- ✓ FI, MoS, RF views
- ✓ Layer-by-layer details (+plots)
- ✓ LAP interface
- ✓ Instant processing

