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# Rapid Generation of Finite Element Models from 3D CAD

Decorative blue geometric shapes consisting of overlapping triangles and a large rectangle at the bottom of the slide.

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*Business Development Director*  
*Modeling and Visualization*

# Company Overview

- A global software and services company focused on information analysis, visualization and advanced computing
  - 20+ Years of experience
    - CAE
    - Product Design
    - Innovation
  - Privately held
  - Over 1,000 employees worldwide
  - 35 Offices: N.A., Europe, Asia/Pac
  - Headquarters: Troy, MI USA



# Expanding Customer Base

Automotive	Aerospace	Heavy Equipment	Government / Defense	Life Sciences / Earth Sciences	Consumer Goods / Oil & Gas

**Over 2,500 Customers in Various Industries**



# Building models faster...

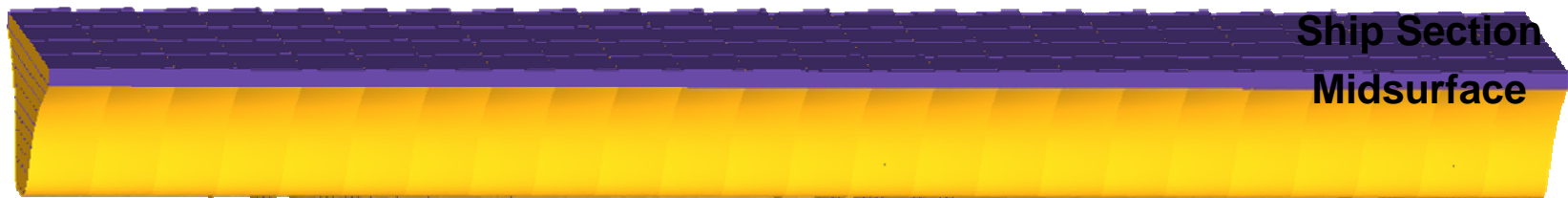
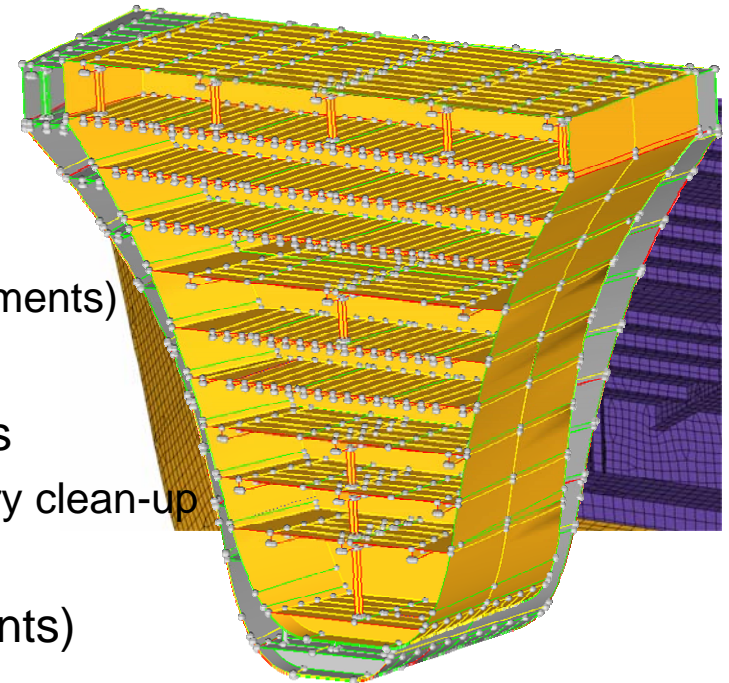
- Engineering challenges in the shipping industry today
  - More than 80% of engineer's time is spent on modeling
  - Generating midsurface models
  - Beam creation and visualization
  - Model size
    - Bringing in multiple meshed ship sections
    - Common limitations are thought to be ~1 Million elements



# Customer Benchmark: Working with Real Data



- Overall Goal: Reduce pre processing time
- Executive Summary
  - Main Tasks
    - Create midsurface & Clean-up geometry
    - Create finite element mesh
    - Merge multiple ship sections (1 Million+ elements)
  - Estimated time by industry 4 weeks
  - HyperMesh completed the project in 2 days
    - 65% of Time – Midsurface creation/geometry clean-up
    - 35% of Time – Meshing
  - Loaded 24 ship sections (3.3 Million elements)



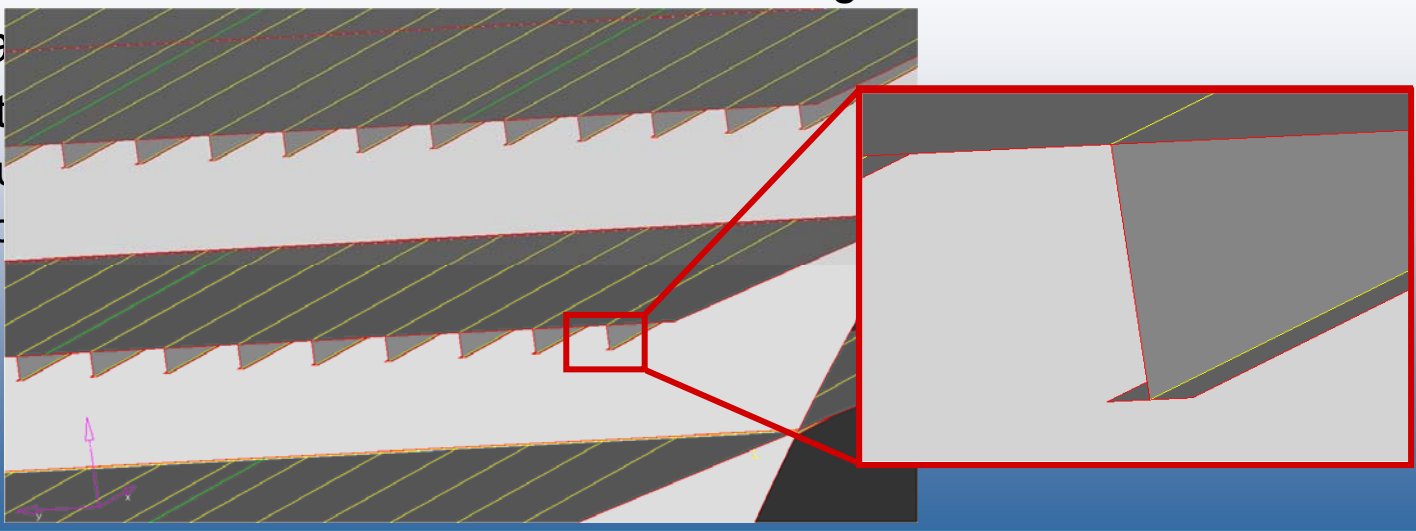
**Loaded 24 sections – Over 3.3 Million elements**



# Reasons HyperMesh Was Successful

- Open Architecture - CAD readers
- Understanding of Ship-building needs for handling solid geometry
  - Creating mid-surfaces from solids
  - Boolean operations
  - Creation of new solids
- Highly efficient and focused surface operations
  - Automatic clean-up - *trimming & stitching*
    - New extend and trim surfaces (1 step)
  - Midsurface technology
  - Complete suite of surface creation and editing tools

- High quality
    - Quality
      - At
    - Extend
- One step  
extend/trim**



# Conclusion

- HyperMesh is a matured technology
  - Can address PDMT challenges better than any other tool TODAY
  - We are eager to invest in order to meet Navy's current challenges
- Goal – further enhance HyperMesh to
  - Significantly reduce cost of design
  - Achieve efficient use of people's time and expertise
    - **80-20 Rule becomes the 20-80 Rule**
- Proposal – *Remove the tedious & manual tasks from the process*
  - CAD Interfaces specific to ship-building
  - Midsurface tool
  - Beam creation & visualization tool
  - Part and property management tool
  - Technology Transfer - *Focused effort on Training & Education*

