

2025

*Lunzer  
Engineering*

*Project: Doral  
Model Yacht*



*CAD + Mechanical Design*

*Solidworks*

*Bambu Labs H2D*

*Graham Lunzer*

# Project Overview

## Objective

This project focused on recreating a detailed CAD model of my family's 2007 Doral Alegria yacht. The goal was to develop advanced surface modeling skills by accurately reproducing the complex curves and flowing geometry of the boat's hull and superstructure.

## Key Features Modeled

- Hull geometry and bow profile
- Cabin top and eisenglass enclosure
- Port holes and railings
- Deck furniture and seating
- Rear swim platform and stairs
- Cockpit doors and deck details

## Project Scope

The complete model was created in approximately **16 hours**, using reference images of the real boat to match proportions and surface flow.



# Modeling Strategy

## Reference Geometry

The model began with carefully traced **side and top profiles** of the boat to establish overall proportions.

## Wireframe Construction

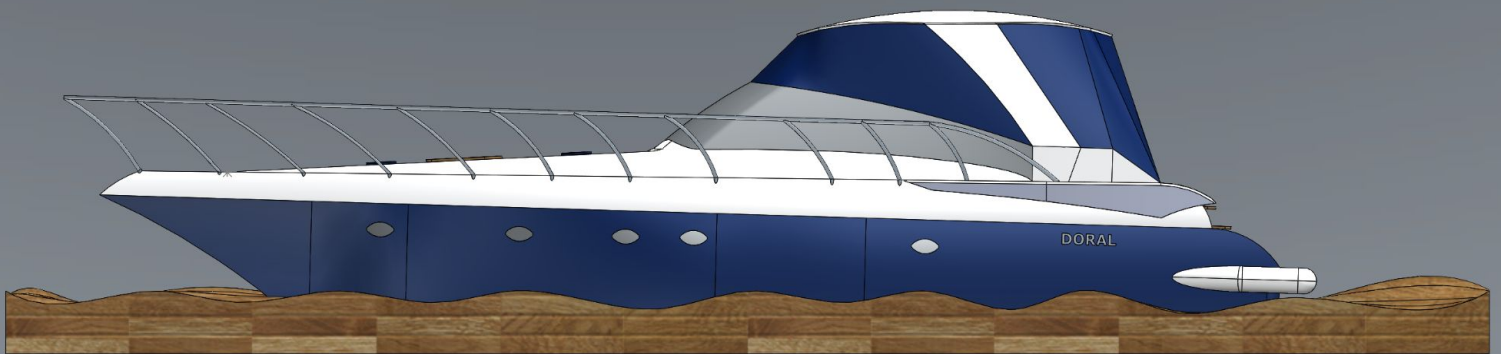
A 3D wireframe structure was built using projected curves and sketch geometry to define the major shape boundaries of the hull and deck.

## Surface Development

Lofted surfaces were then created between guide curves to generate the flowing geometry of the hull and upper structures.

## Key Tools Used

- Projected curves
- Lofted surfaces
- Guide curves
- Surface trimming and knit operations



# Surface Modeling Process

## Initial Surface Creation

The hull was generated using multiple lofted surfaces guided by the projected curves from the wireframe geometry.

## Surface Flow Refinement

Careful adjustments were made to ensure smooth transitions between surfaces, especially along the bow and cabin structure.

## Version 1

The initial attempt produced surfaces that did not flow smoothly and resulted in visible transitions between patches.

## Final Version

The surfaces were rebuilt using improved guide curves, creating a continuous and visually smooth hull form.



# *Final CAD Model*

## **Features Included**

- Full hull geometry
- Cabin structure and enclosure
- Eisenglass covers
- Deck railings and hardware
- Rear swim platform and stairs
- Deck furniture and cockpit details

## **Modeling Time**

Approximately **16 hours total development time**



# *Project Outcome*

## **Result**

The final model successfully captured the overall shape and visual details of the real boat while serving as a focused study in surface modeling techniques.

## **Lessons Learned**

- Surface models rely heavily on strong guide curves
- Small changes in profiles greatly affect surface flow
- Reference images are essential for maintaining proportions

## **Future Improvements**

- Higher-detail deck components
- More refined railings and hardware
- Photorealistic rendering of the model

