Starship CAD Project

AME 5193: Intro to Computer-Aided Design

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Figure 1: Overall starship render (final configuration).

Executive Summary

This document summarizes the parametric design and assembly of a Starfleet-inspired starship created in SolidWorks. Key objectives included modular subsystem architecture, constraint-driven assemblies (mates), symmetry and patterning for efficient iteration, and presentation-quality renders. The deliverables comprise a complete assembly, neutral exports (STEP/STL), and a concise portfolio summary intended for non-CAD reviewers.

Design Objectives

- Apply parametric, modular design principles to saucer, engineering hull, and nacelles.
- Use symmetry planes, feature patterns, and fillet strategy to reduce model complexity.
- Build robust assembly mates for repeatable alignment and motion constraints.
- Produce clear visuals and lightweight exports for recruiter-friendly review.

System Overview

Figure 2: Overall assembly highlighting saucer, engineering section, and twin nacelles.

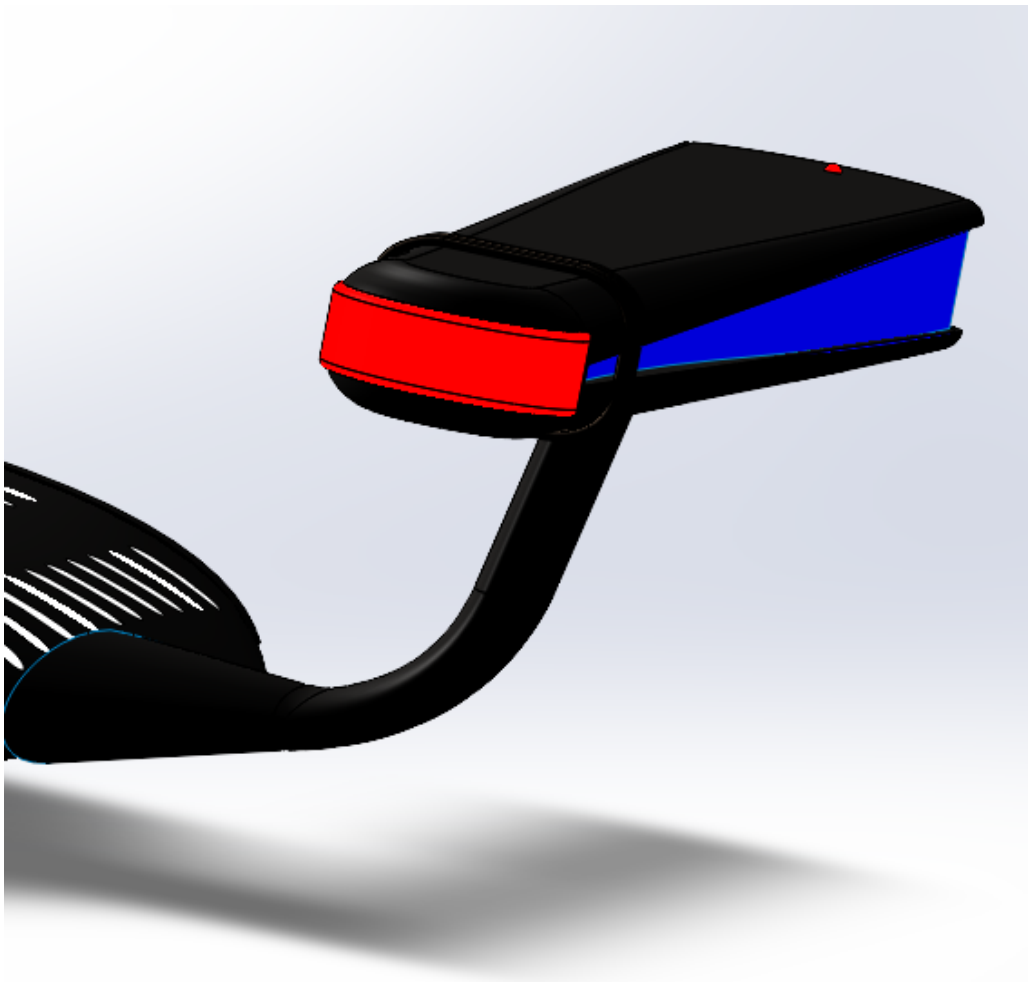

Figure 3: Profile view emphasizing streamlined geometry and symmetry.

Subsystem Highlights

Command Module

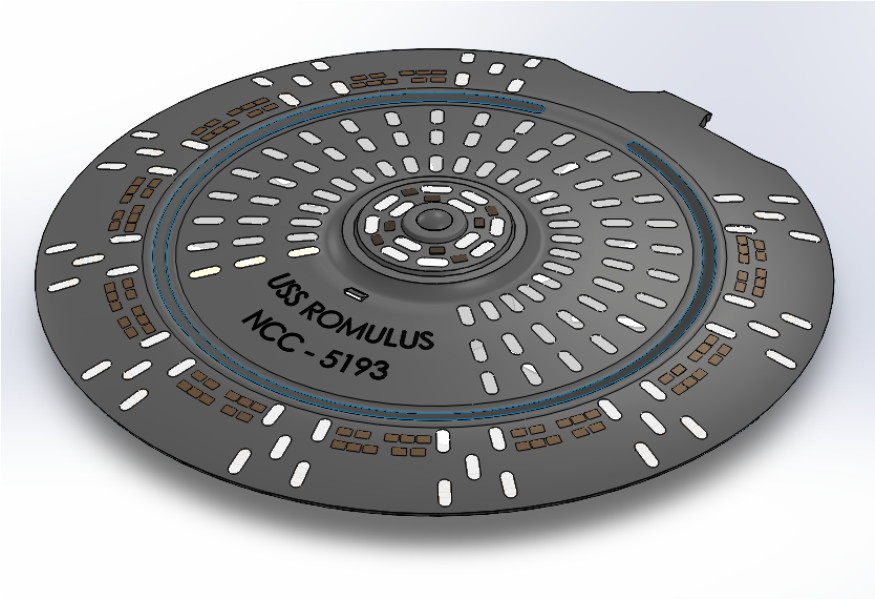

Figure 4: Command/bridge section with forward modules and canopy geometry.

Design intent: clean loft transitions, curvature continuity, and alignment to the ship centerline. Interfaces defined to mate reliably with saucer section.

Engineering Section

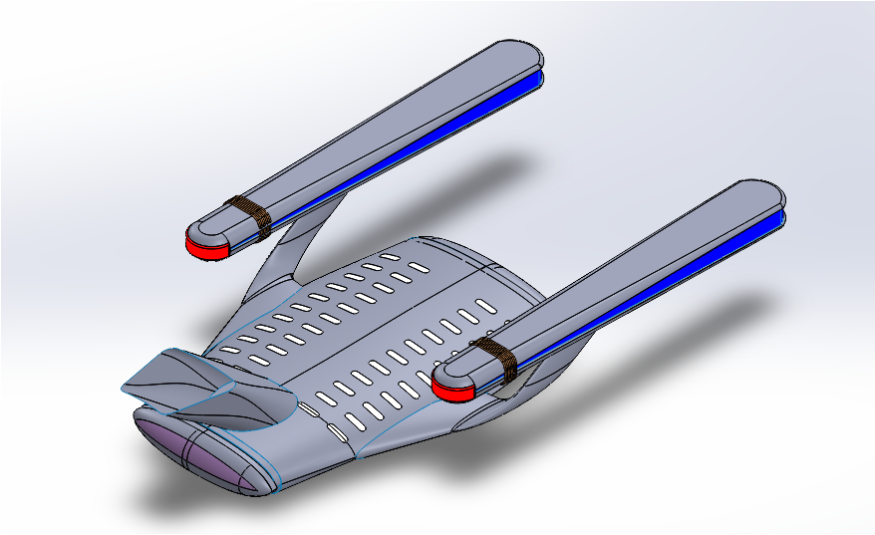

Figure 5: Engineering hull with internal volume for propulsion and docking interfaces.

Design intent: structural backbone tying saucer and nacelles, with consistent fillet hierarchy and accessible mounting planes.

Nacelles

Figure 6: Nacelle details and pylons; attachment features ensure repeatable alignment.

Design intent: mirrored components driven by common parameters; pylon thickness and angles set by reference geometry for quick iteration.

Detail Example

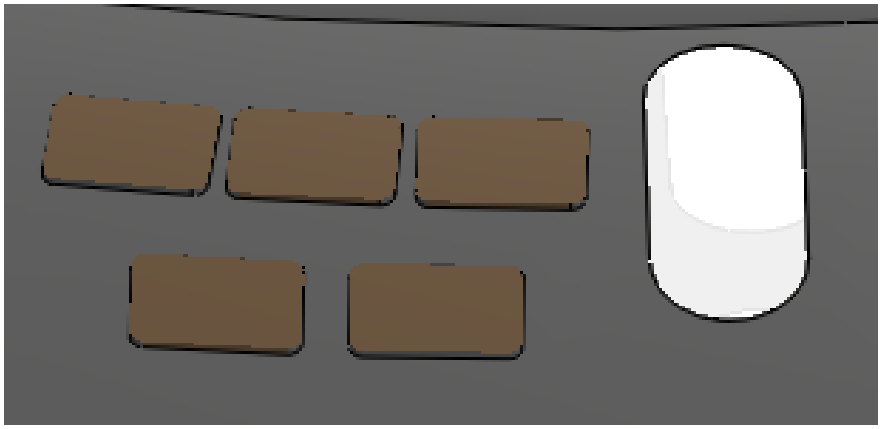

Figure 7: Window/e-pod details providing scale cues and surface interest.

CAD Implementation

Software: **SolidWorks** (version *fill in*). Units: meters. Core techniques: reference planes for symmetry, sketch constraints for intent, feature patterns for repeated elements, and consistent fillet/edge treatment. Assembly uses primary mates (planes, axes) first, followed by local mates at interfaces. Neutral exports (STEP/STL) are provided for viewing without CAD.

Conclusion

The project demonstrates CAD modeling discipline, subsystem integration, and clear technical communication. The model's parametric structure supports rapid changes, while curated renders and neutral exports make the work accessible to reviewers.