

Structural PCB Housing Design

Scope: 3D Modelling

Application: Clearview Mirror

Designing a 3D Clearview mirror structure involves selecting durable materials like aluminum or high-strength plastics, employing advanced manufacturing techniques such as CNC machining, and applying finishes like anodizing or powder coating for durability. The 3D model must securely house the PCB with custom brackets or slots, while also managing heat and ensuring cable accessibility. This comprehensive approach ensures both functionality and aesthetic appeal for the Clearview mirror.

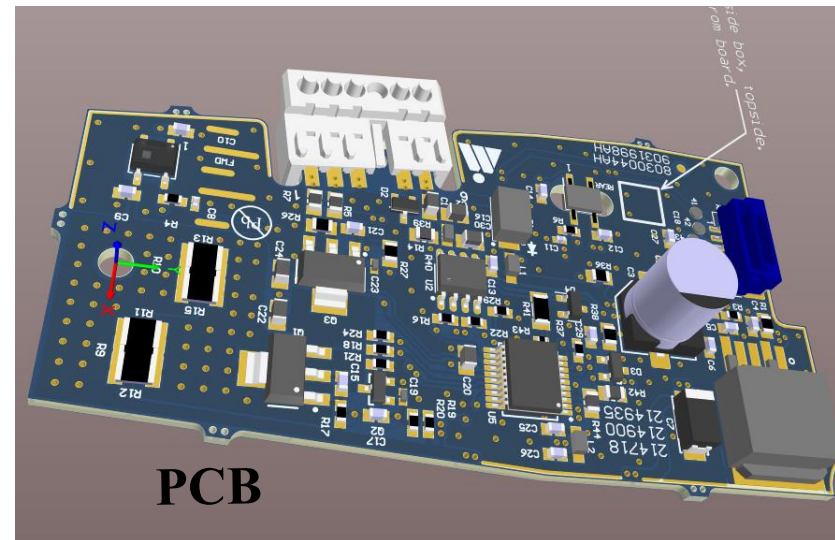
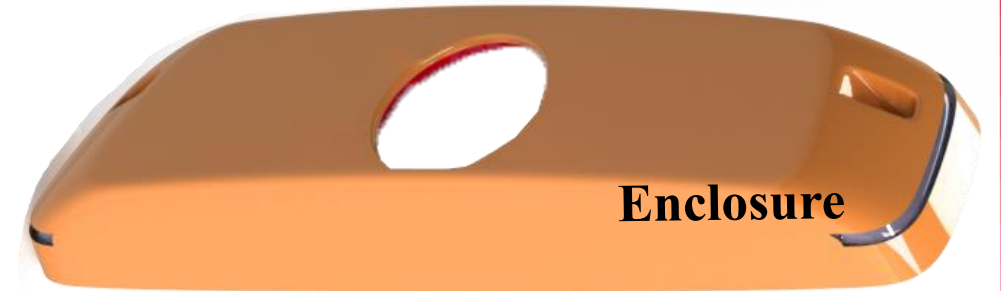


MCAD – Challenges

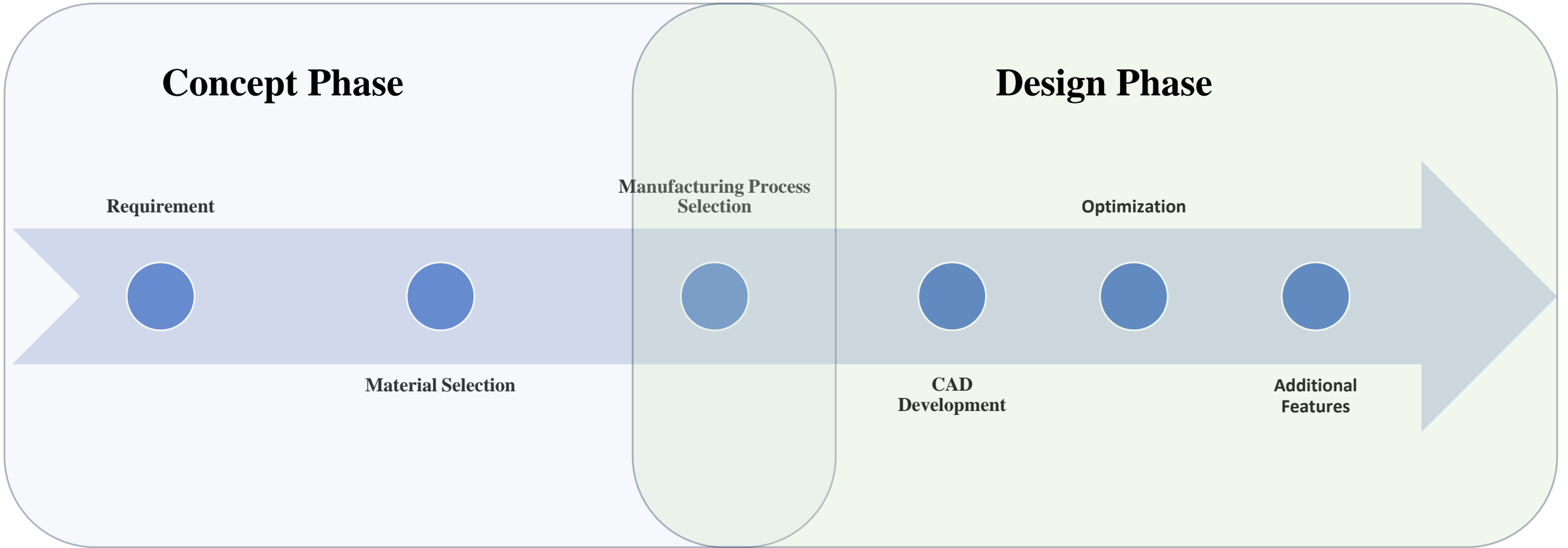
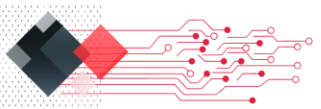
The client approached us with a request to design a 3D support structure for Clearview Mirror circuit board inside the enclosure. The information they provided, presented a significant challenge for us to work with.

Challenges:

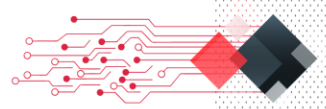
- The 3D structure should be perfectly fit inside the existing enclosure.
- Design should hold PCB inside the enclosure.
- Less material need to be used for the 3D structure.
- The design also needs to hold the Display (Car Middle Mirror).
- Opening for Light sensor.



MCAD – SoW



Every stages of work have multiple brainstorming and review with the client



Concept Phase (cont.)

Requirement

They share info about the PCB, a step file for the PCB & Enclosure for accurate fit and a document contain additional details. We collect all these details and organize them in a step-by-step order.



Material Selection

- Need to choose material for the enclosure that has the low weight and strength along with low cost.
- **Polypropylene Enclosures:** Provides excellent impact resistance. It's a lightweight and low cost material for automotive application

Manufacturing Process Selection

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The condition for Manufacturing Process Selection as per the inputs are

- creating parts with tight tolerance
- excellent part-to-part repeatability
- Cost
- Fast cycle time

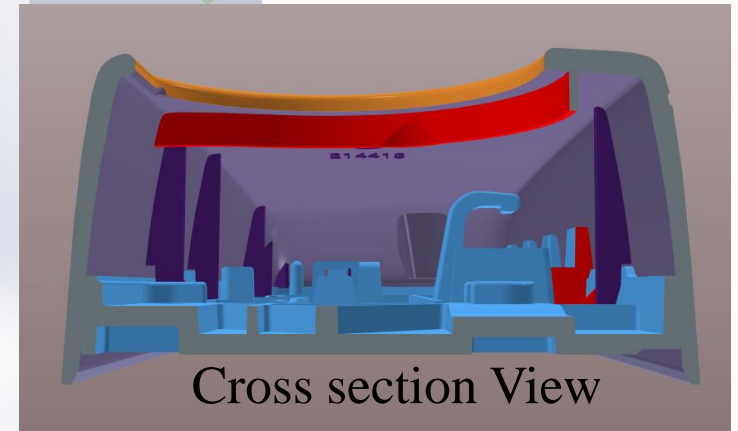
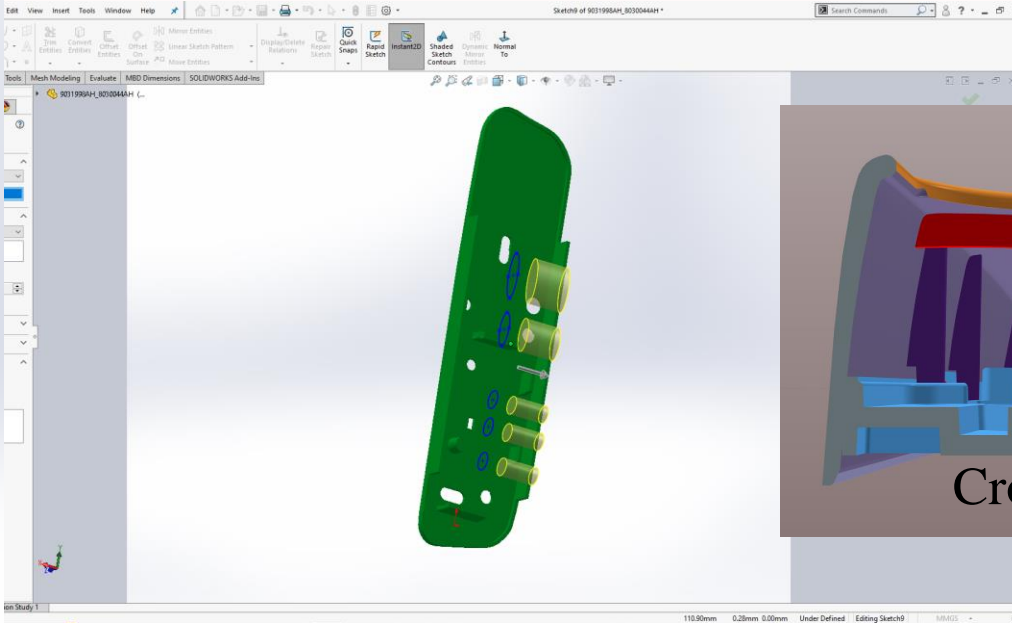
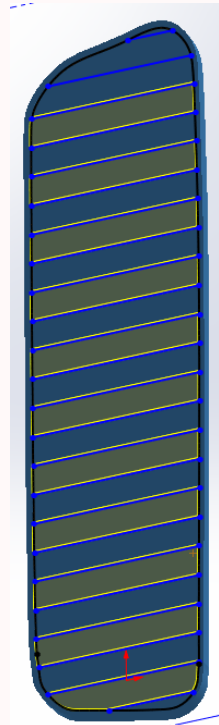
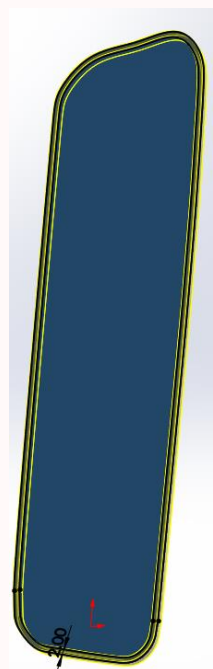
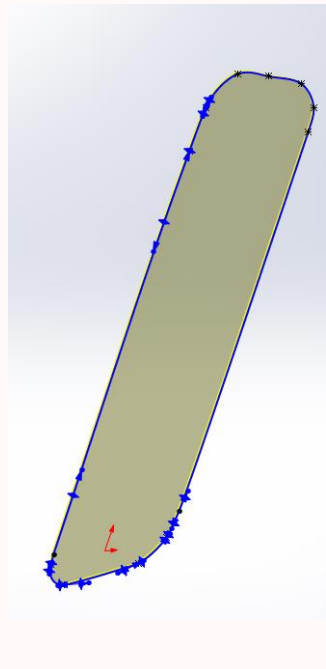
Based on that, Injection Molding was selected.

Design Phase

CAD Model development stages

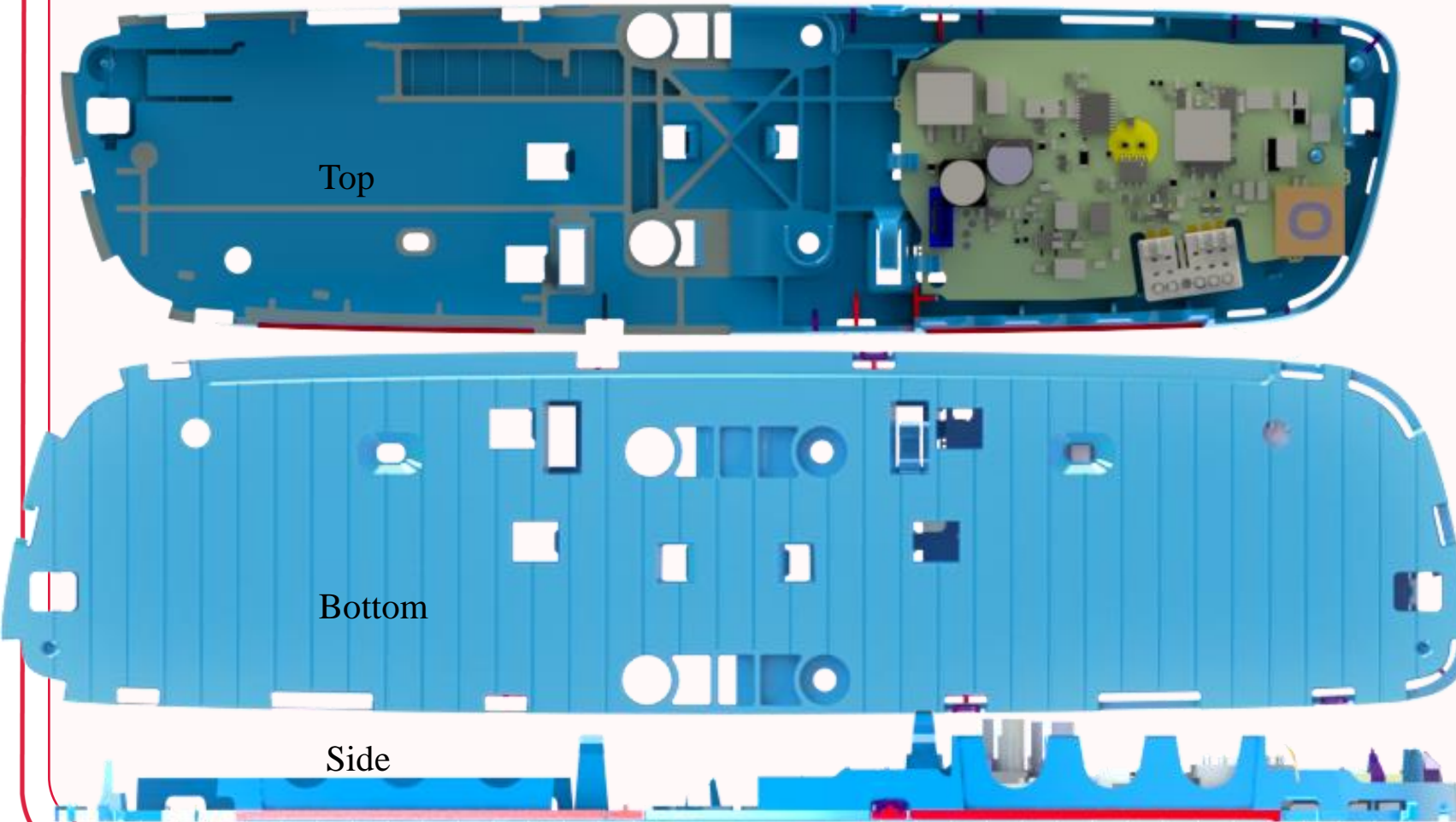
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Design Outline → Adding Details → Optimizing Design → Aesthetics improvement



Result

Final CAD Model



The final structure contain multiple ribs for strength with aesthetic design. The PCB is hold at 5 different locations.

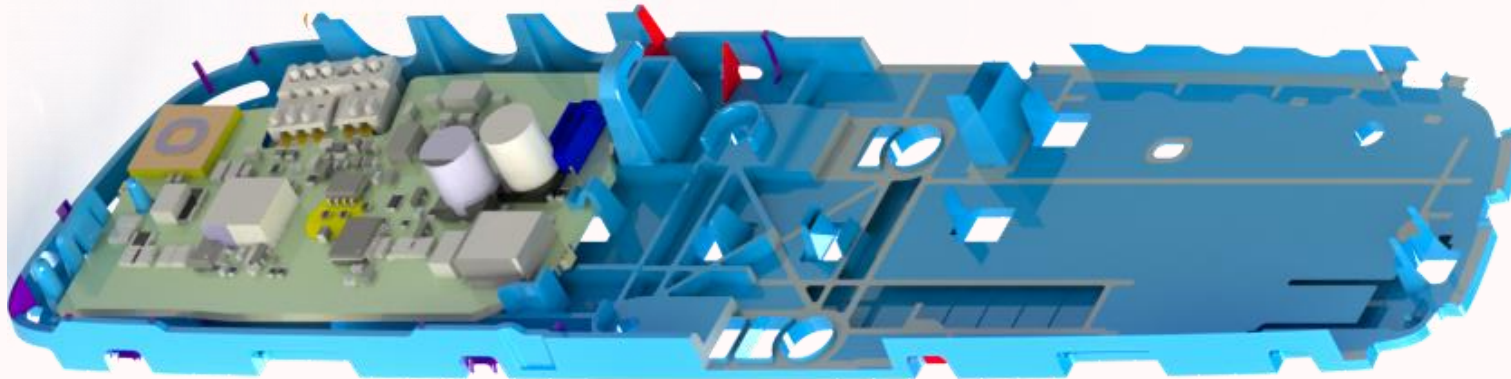
Final Dimension: 70x100mm
(Approx.)

Wall Thickness: 0.5mm



Result

Final CAD Model



Isometric view



Part View



A Heartfelt Customer's Voice

"We couldn't be more pleased with the exceptional work delivered by this outstanding team. Despite facing various challenges, they skillfully designed 3D structure to support PCB inside enclosure with a perfect blend of creativity and expertise in MCAD Engineering Services. What truly sets them apart is their commitment to providing a cost-effective design without compromising on quality. The efficient manufacturing process they implemented not only saved us money but also ensured a swift turnaround. In a surprisingly short time frame, they not only met but exceeded our expectations, marking a significant milestone in our project. This team has proven to be the go-to choice for anyone seeking a winning combination of time, cost, and quality."



Conclusion

- In summary, Despite the challenges our team successfully designed the Enclosure after lots of brainstorming and with our expertise in MCAD Engineering Services.
- The final Design is produced with selecting material that has high durability and high thermal conductivity.
- we provided the cost effective design and the best ways to manufacturing the product.
- With completing this design in short time period, marks a significant milestone in our journey.

