

Manikin Transport and Storage Unit

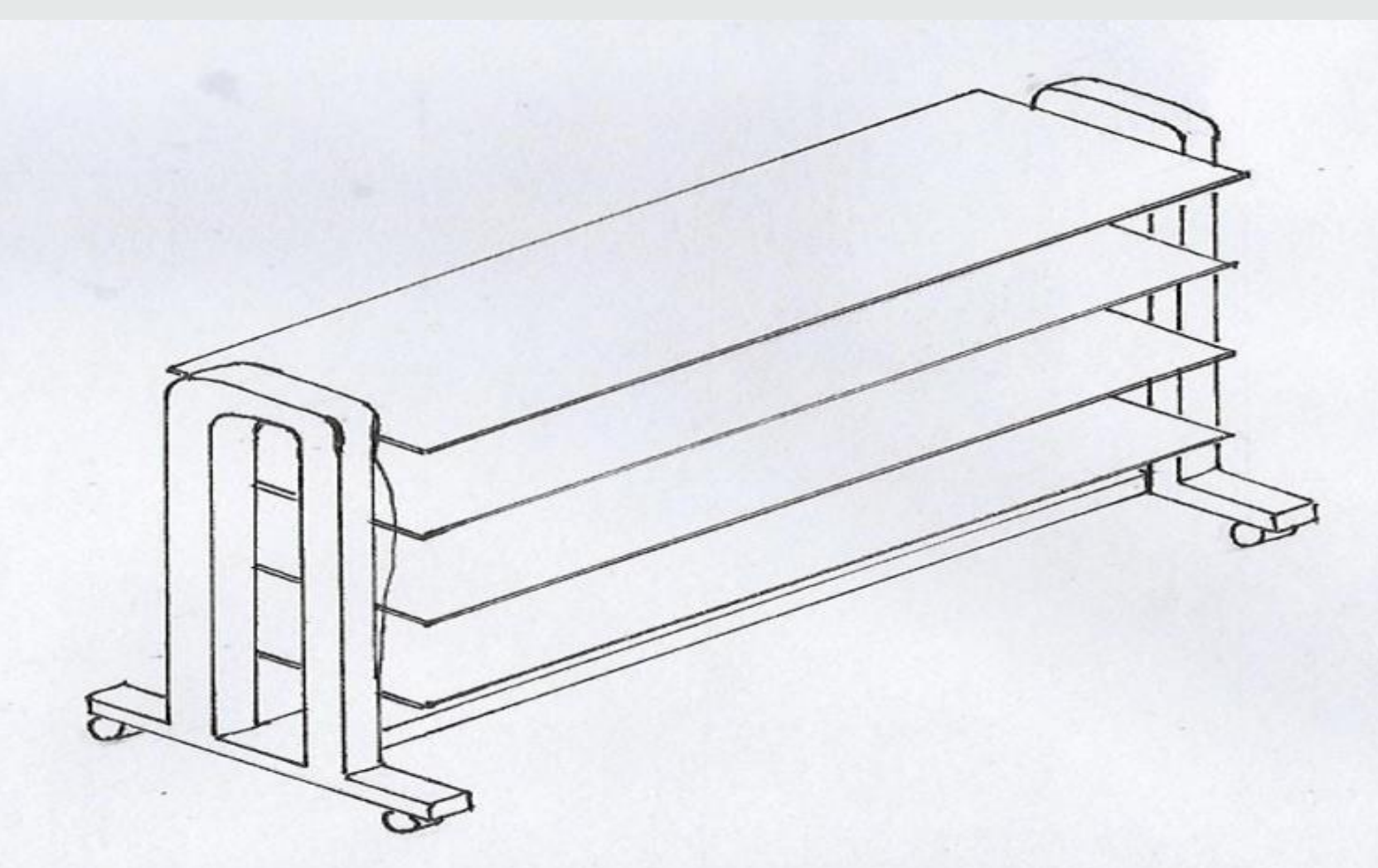
Introduction

- The Centre for Collaborative Clinical Learning and Research (C3LR) required a solution to lift/store manikins used in simulation lab in their facility.
- The manikins are used to simulate various medical conditions used to train health science students.
- At times, these manikins are replaced with real volunteer actors to better simulate patient conditions.



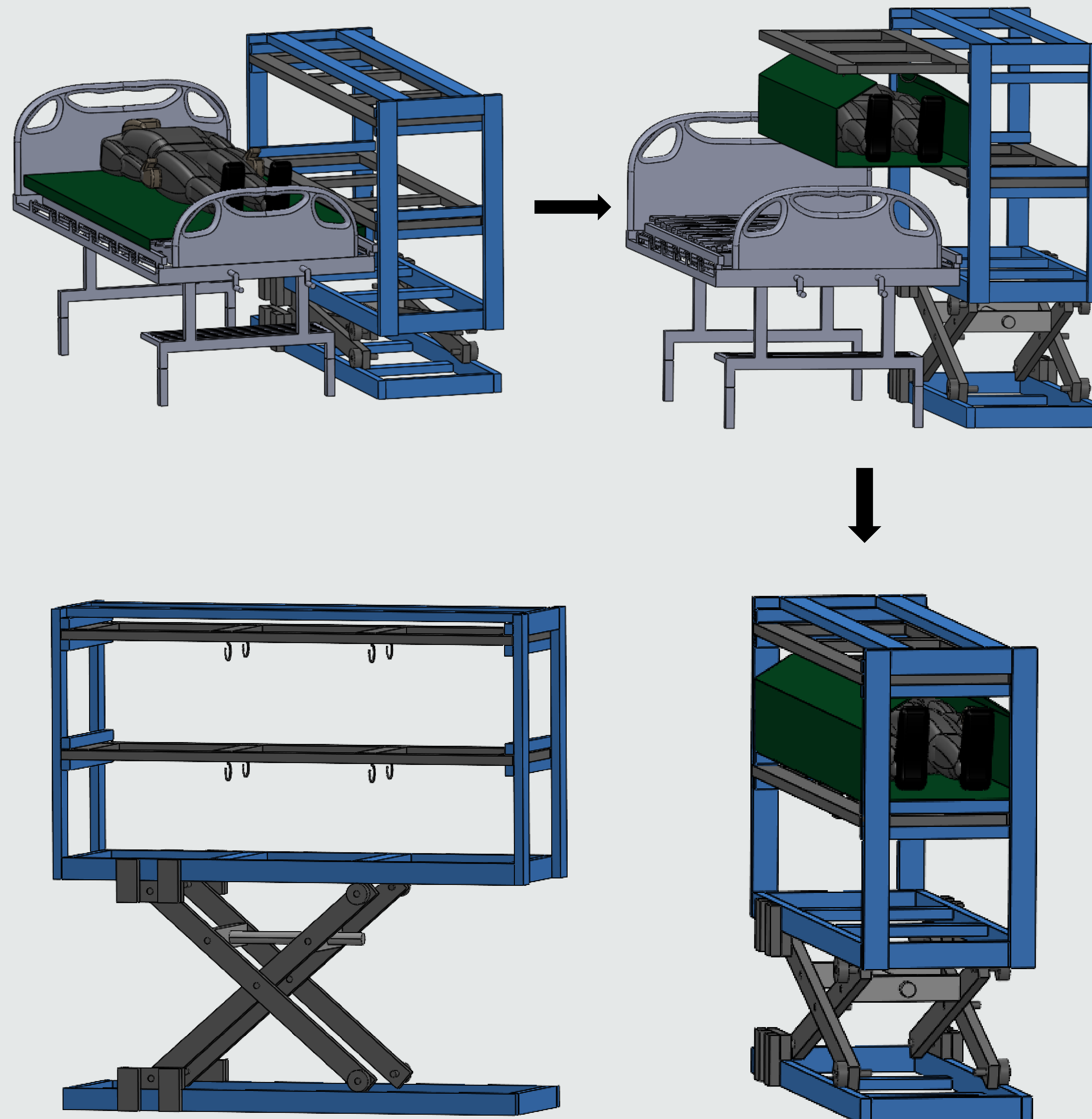
Design Process

- Initial design scope: To build a mechanical ceiling lift to pull manikins from the beds and store them close to the ceiling when the beds needed to be freed.
- Post-Site visit, it was concluded that the ceiling lift was not convenient due to electrical, mechanical and plumbing conduits.
- Team 21 devised a transport and storage unit as a solution to help move and store the manikins when the beds need to be freed.
- Extendable drawer platforms were used to store 4 manikins in modified design. Client Feedback introduced new requirement of using existing manikin slings instead of platforms for manikin storage. Hooks were added to hold the slings.
- Sagging distance of the sling was considered and number of manikins stored at a time was reduced to 2.



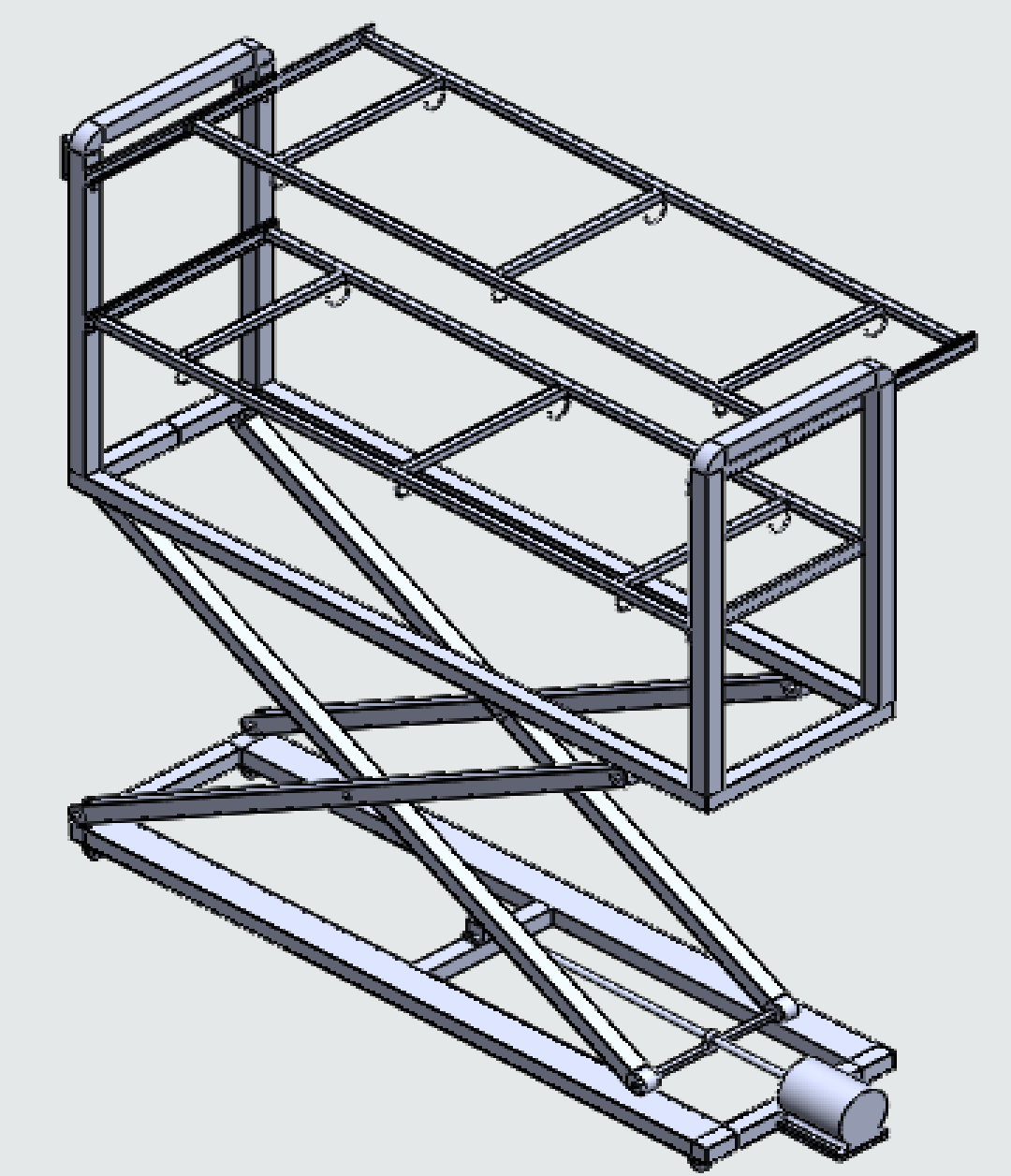
Details of Design

- Design has a capacity of storing and lifting 2 manikins.
- Drawers with hooks connect to the manikin transfer sheet holding the manikin. The drawer can then slide back into the cart, where the manikin is stored.
- Due to budget restrictions the prototype was manufactured using lumber consisting of all 2"x4" boards.
- For a final design that would be used in the C3LR, a stainless steel would be used to manufacture the unit in order to maintain cleanliness.



Conclusion and Recommendations

- The prototype does not depict all the features of the Final design; Locking Mechanisms, Wheel Brakes, Drawer Locks and Counter-Weight
- The trolley design solves the transport and storage issue of the C3LR facility. Motorized systems may improve performance in terms of lifting and navigation.
- The cost of the product is high (\$2500) but if manufactured in bulk the cost of fabrication will be greatly reduced.
- Stainless Steel used for the Final Design is safe for use in the intended environment. Material will not stain or corrode and possible to wipe with solvent for disinfection.
- Counterweight implementation will allow for the handling of heavier manikins and allow further extraction of the drawer frames for manikin loading.



References

- [1] - "CAEAres User Guide," 2020. [Online]. Available: https://caehealthcare.com/media/files/User_Guides/Aras-User-Guide.pdf. [Accessed: 2020].
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- [3] - S. Rafsan, "Hospital Bed," *Grabcad*, 32-Aug-2016. [Online]. Available: <https://grabcad.com/library/hospital-bed-4>. [Accessed: 31-Mar-2021].