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Title

Pulmonary Assist Device (PAD)

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Pulmonary Assist Device (PAD)

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Project Goal

- Create device to stabilize patient's lung after suffering a tension pneumothorax
- Current treatments involve chest tubes that are prone to clotting and infection
- Can be used in non-sterile environment
- Can be used in transit and at the hospital
- Field and Hospital Versions of PAD

Project Timeline

31-Mar 20-Apr 10-May 30-May 19-Jun

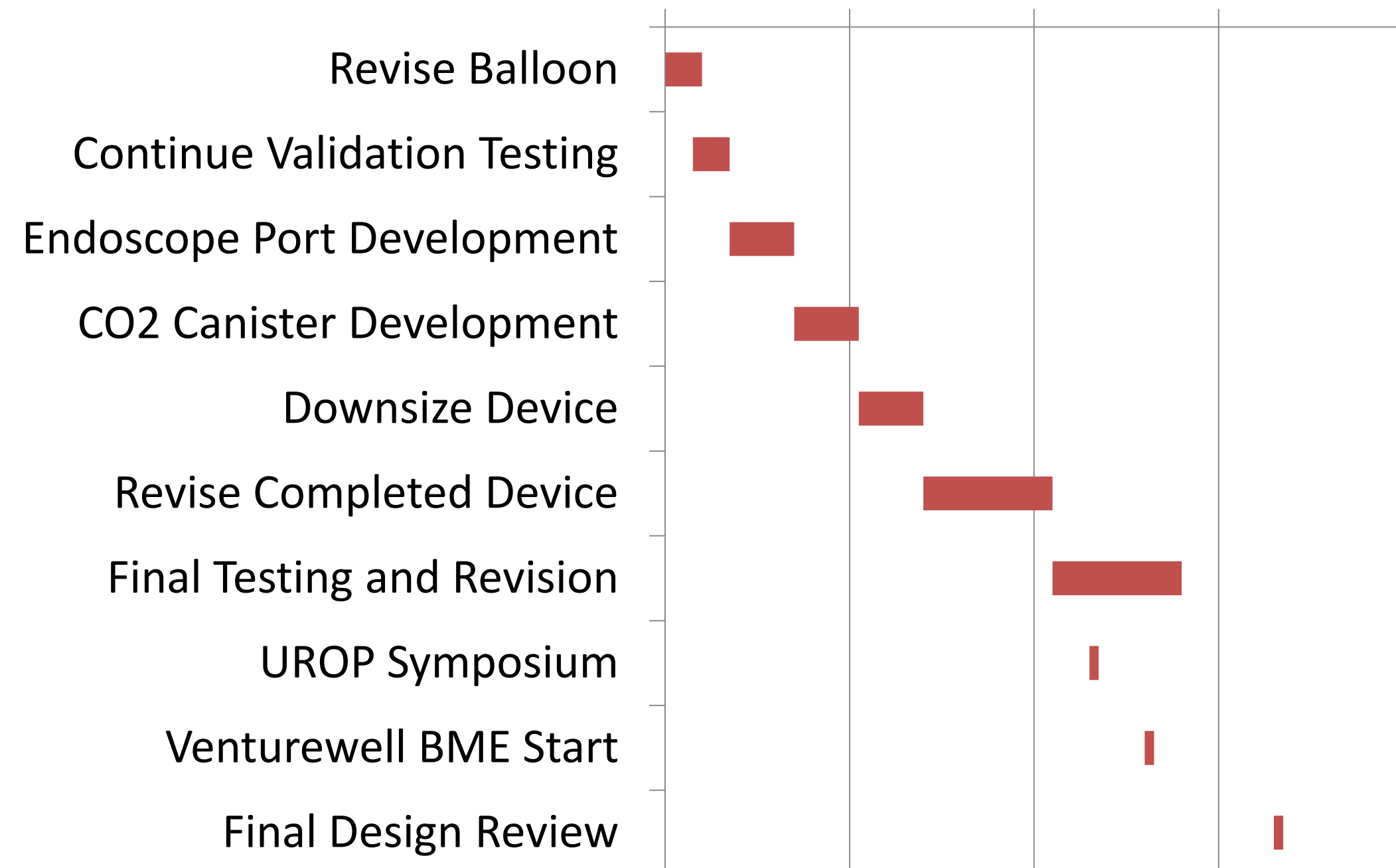


Figure 1 | Projected time line for the completion of Pulmonary Assist Device (PAD)

Work Cited & Acknowledgements

- American College of Surgeons. *ATLS: Advanced Trauma Life Support for Doctors*. Chicago: 2008.
- "Chest Trauma Pneumothorax-Tension." *TRAUMA.ORG: Thoracic Trauma*. Trauma.org, Feb. 2004. Web. 03 Nov. 2014.

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Project Design

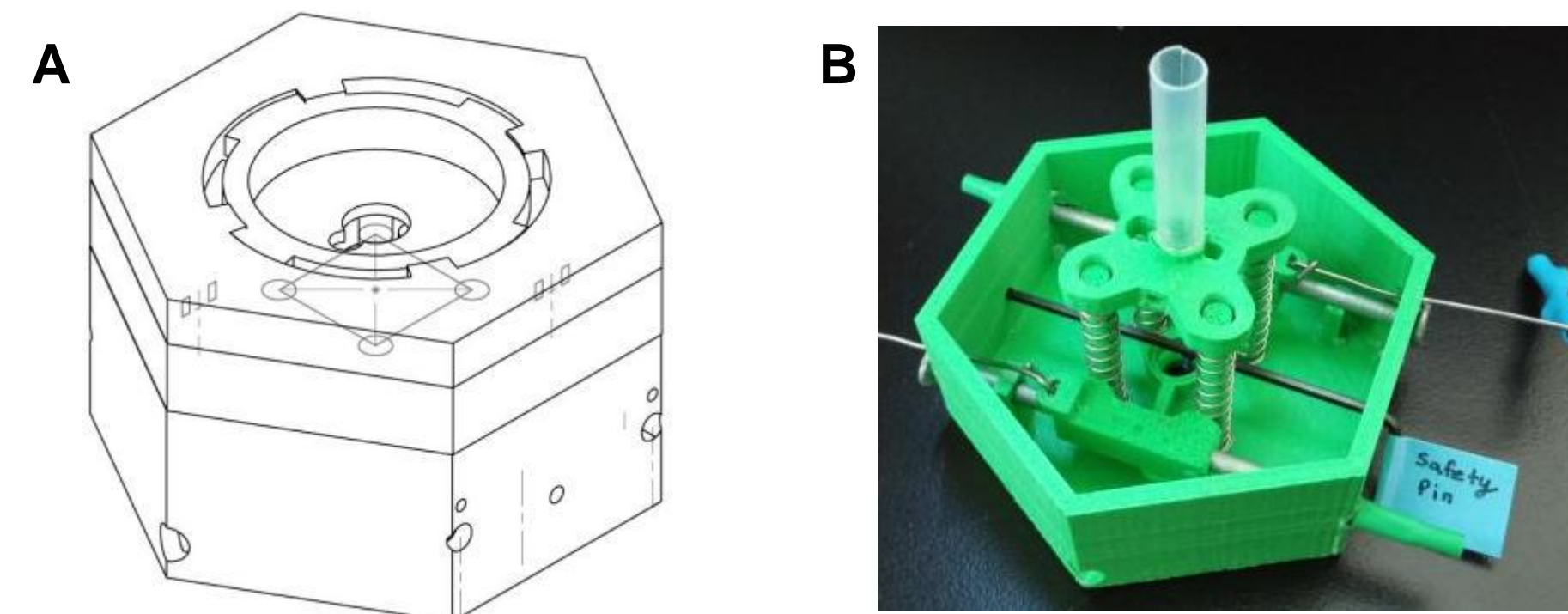


Figure 2 | Gasket Prototype. A, Full gasket assembly without balloon catheter. B, Section view of gasket showing spring loaded system with a mock nylon-12 tubing as a place holder for the balloon catheter.

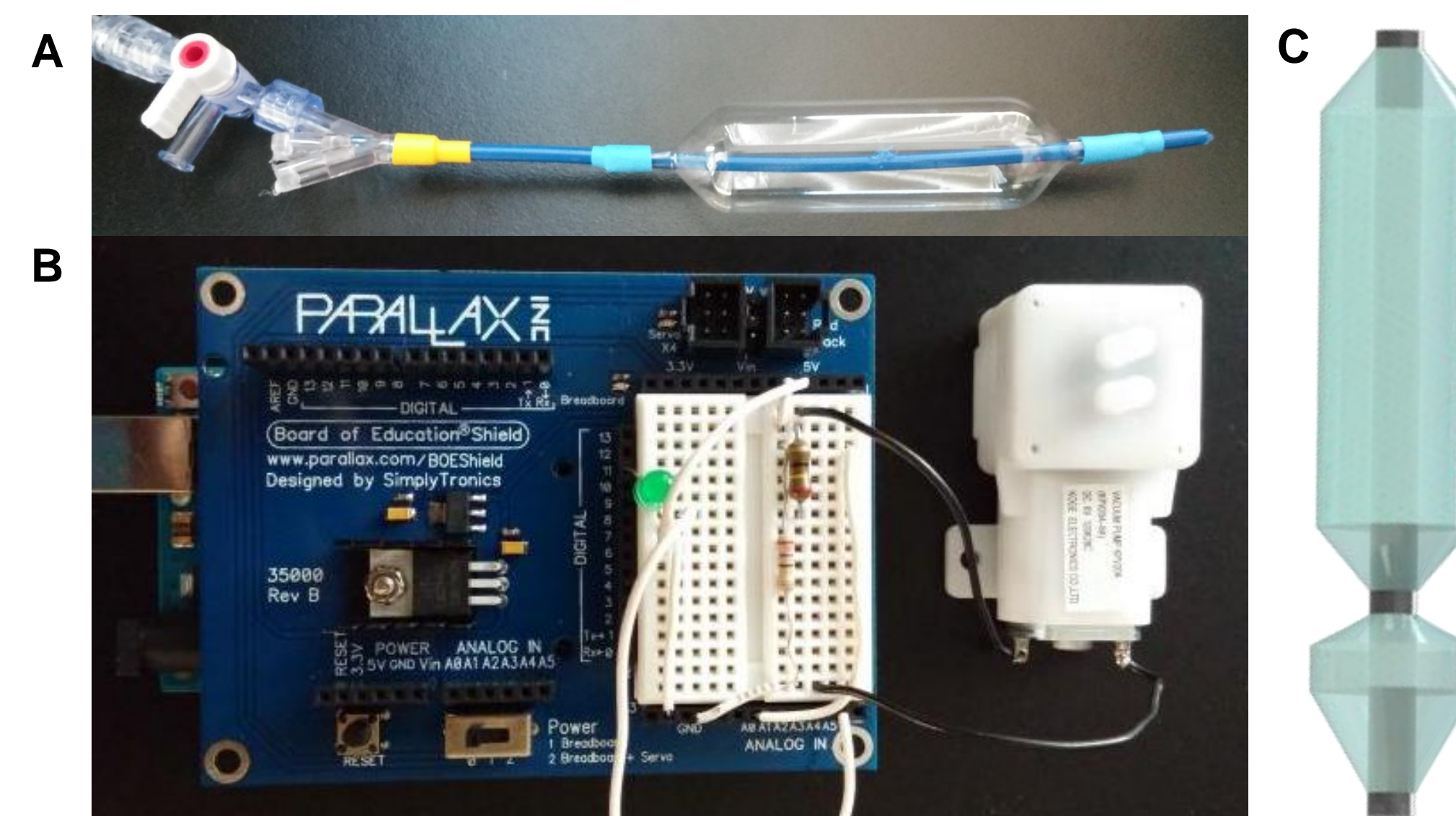


Figure 3 | Balloon Catheter and Vacuum Pump. A, Balloon catheter implements a Y connector which separates the inputs from the vacuum pump, balloon pump, and a guide wire. B, Arduino/shield circuit set up that powers the vacuum pump and the LED indicator that provides feedback for successful catheter deployment. C, Ideal model of the balloon catheter.

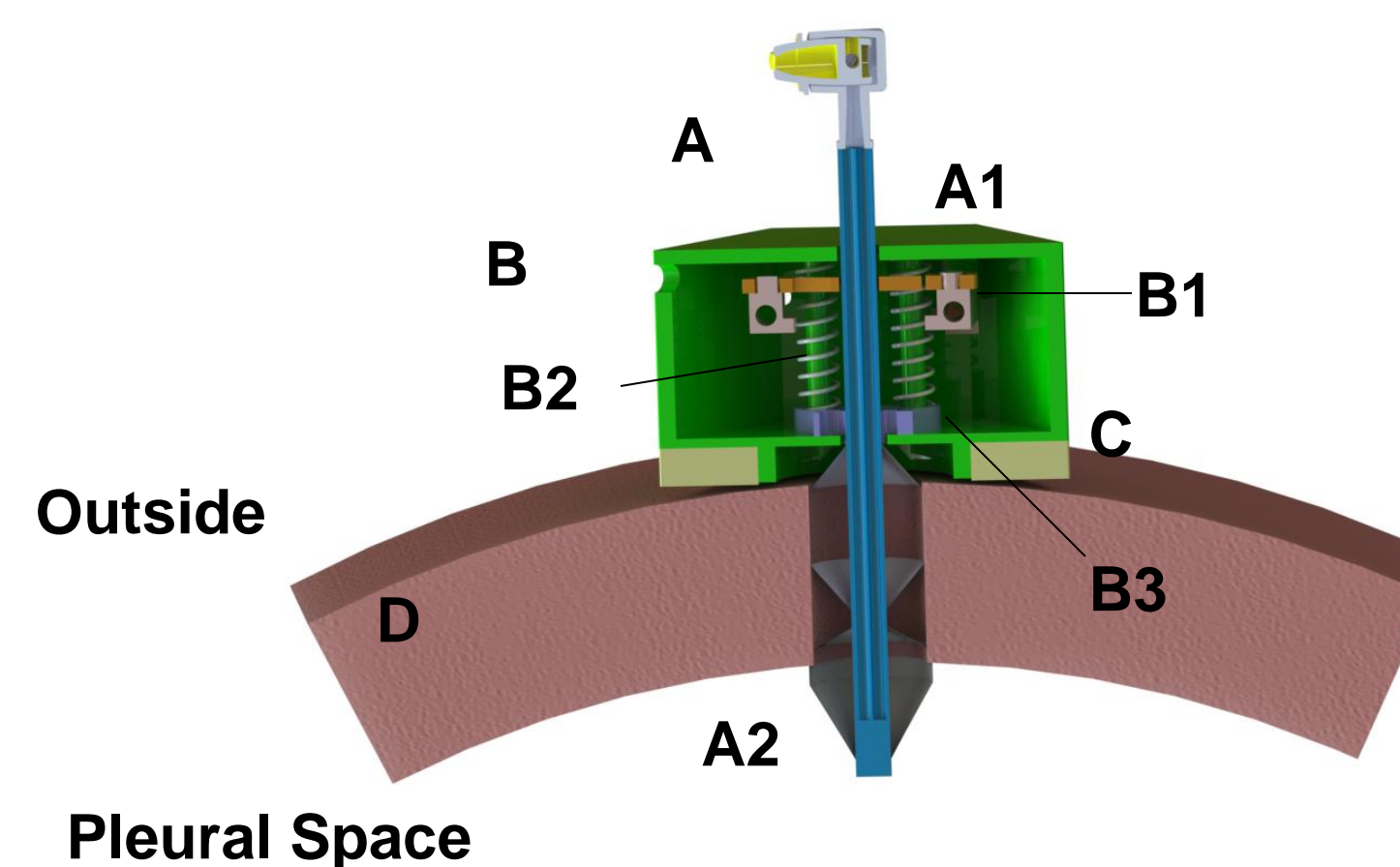


Figure 4 | Full Pulmonary Assist Device Assembly Application. A, Balloon catheter (blue). A1, Multi-lumen tube. A2, Polyurethane-Nylon Balloon. B, Gasket (green). B1, Sliding rail to prevent premature deployment. B2, Springs for deployment mechanism. B3, Catheter holder. C, Locking/Tegaderm ring (gray). D, Chest cavity (purple).

Team Organization

| Members | Team Role | Project Responsibility |
|----------------------------|-------------|---------------------------------|
| Horacio Michael Estabridis | Team Leader | SolidWorks/Gasket Design |
| Danny Baldo Jr. | Team Leader | SolidWorks/Balloon Construction |
| Vinson Tran | Team Member | Testing Platform |
| Kelsey Fung | Team Member | Testing Platform |
| Thanh Chung | Team Member | Pump Design |
| Anthony Pham | Team Member | SolidWorks/ Gasket Design |

Table 1 | Team members and members' duties. All team members are currently in the Henry Samueli School of Engineering, Department of Biomedical Engineering

Progress & Current Status

- Revise Field Version of Device
- Device & Material Validation

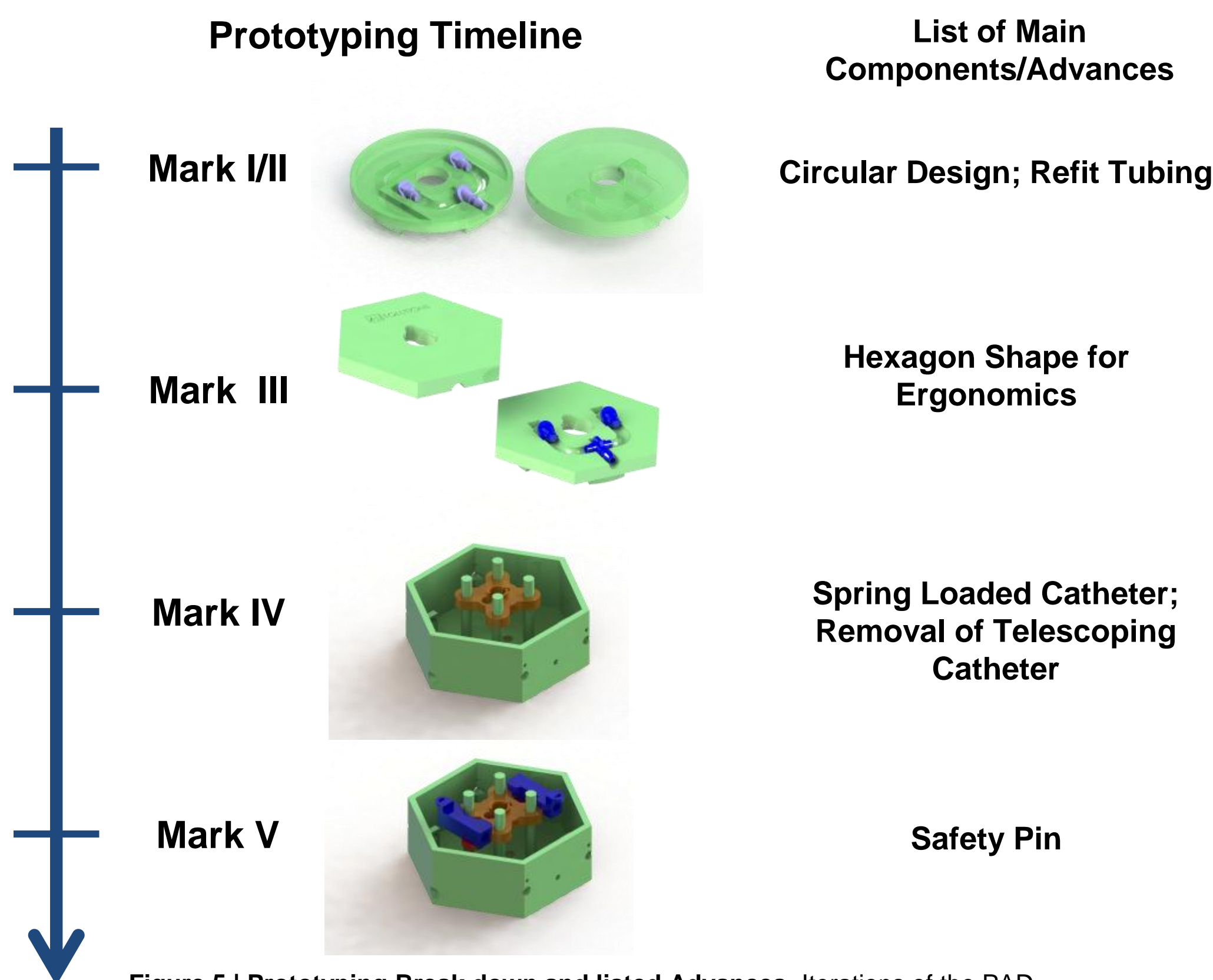


Figure 5 | Prototyping Break down and listed Advances. Iterations of the PAD.