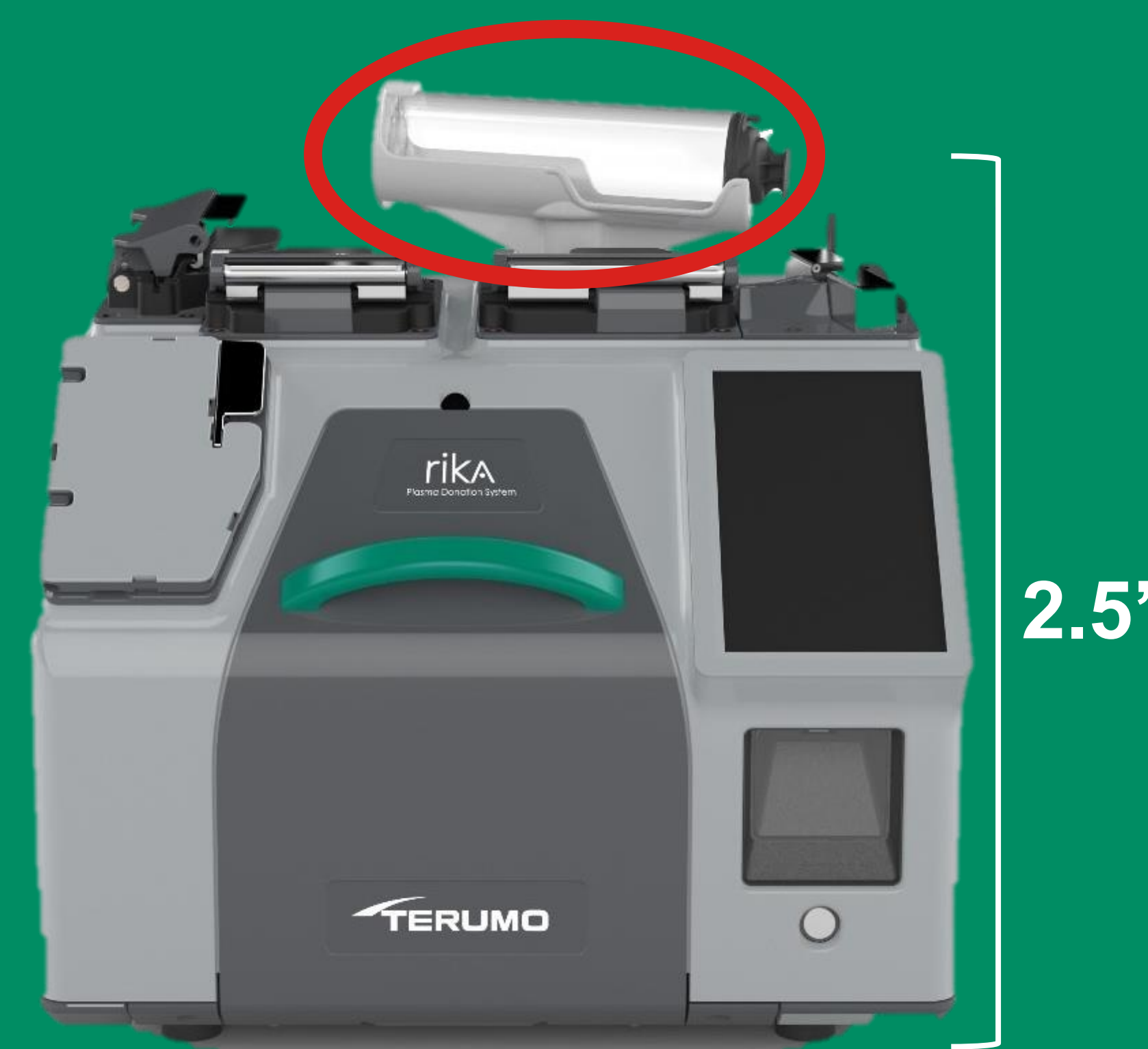


Project Background

- Our assembly interfaces with the Rika Plasma Donation System.
- It utilizes a remixing of plasma and red blood cells to improve donor experience and safety.
- The Rika is the quickest in the industry with collection completed in <35 minutes while improving donor experience because there is never more than 200 mL of red blood cells outside of the donor.



Terumo Rika System

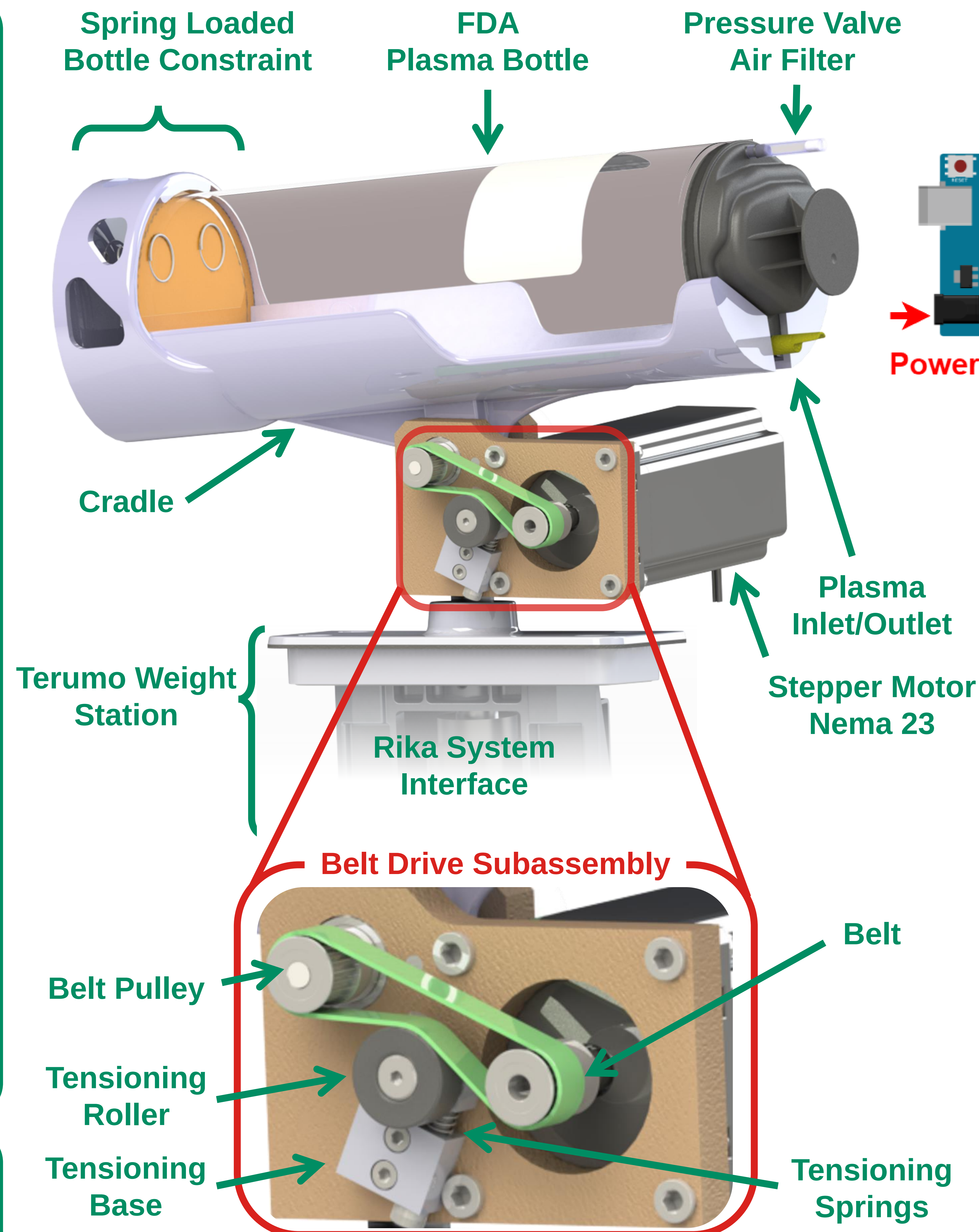
Why Increase Plasma?

- Hemophilia A patients require 1,200 donations a year and immune deficient patients require 130 donations a year.
- There is a global shortage of plasma, in which the US supplies 66% of the world's plasma stock annually.

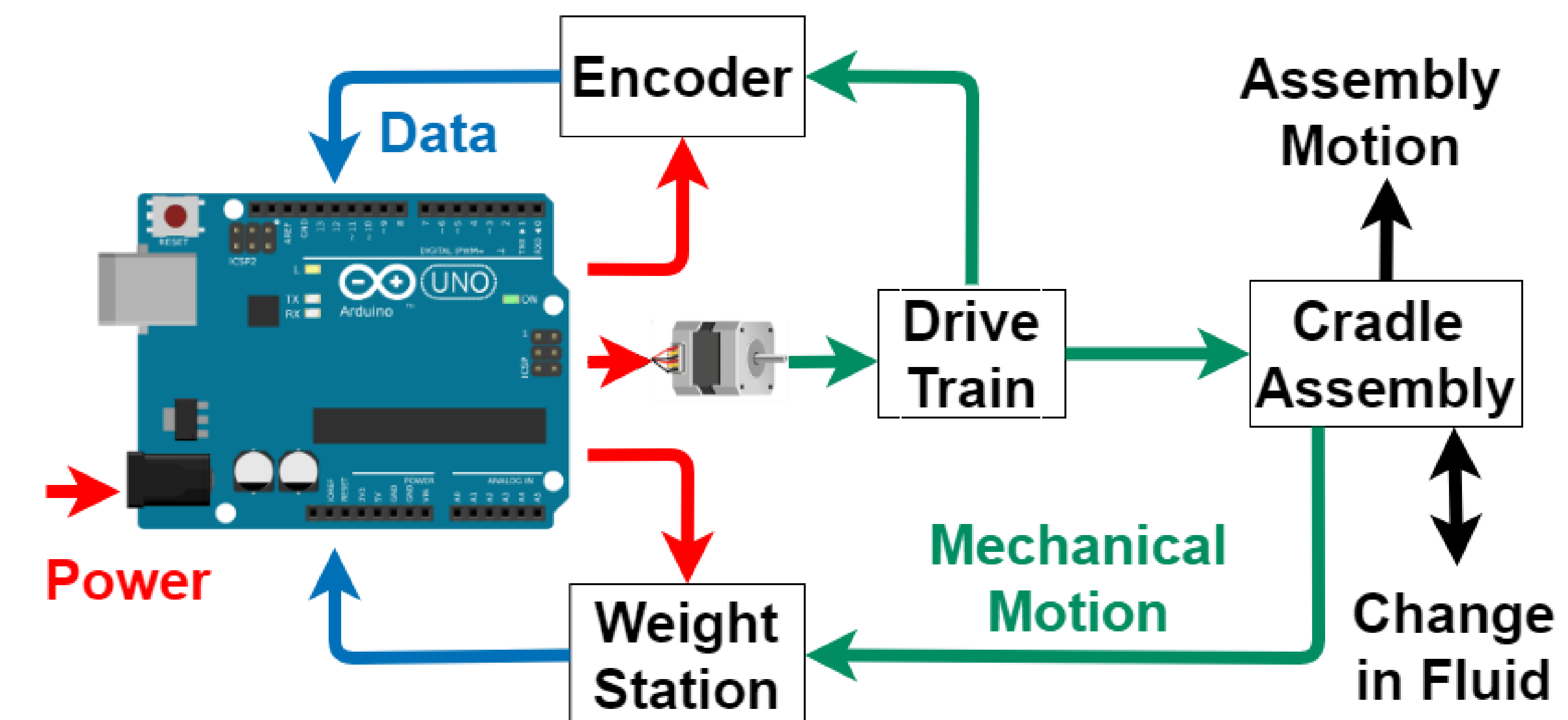
Objective

Our team has partnered with Terumo Blood and Cell Technologies (BCT) with the task of creating an automatic assembly system that seamlessly interfaces with their new plasma collection device, the Rika, to:

1. Increase the volumetric fill of the bottle at least 25%.
2. Limit the effects of **water hammer** and **hysteresis** of the plasma while inside the FDA plasma bottle.
3. Maintain a **Poka-Yoke** philosophy across design.



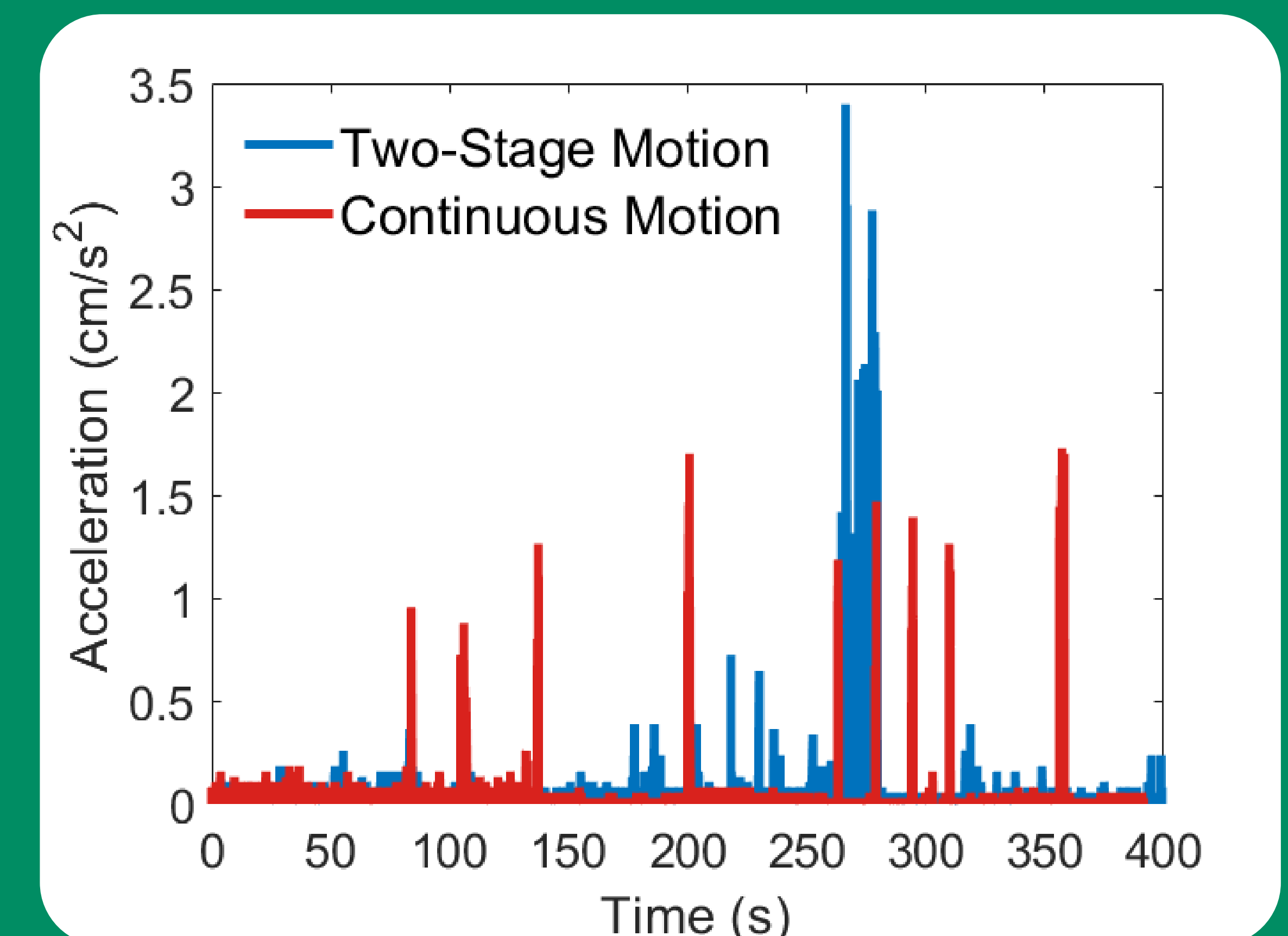
Electronics



Testing

Comparing two motion strategies:

1. Two-stage, from current orientation to max fill
2. Multistage motion throughout collection



Testing has concluded that we can best minimize water hammer and hysteresis through multistage motion.

Conclusion & Future Work

- We exceeded our 25% increase in volume and achieved the Poka-Yoke design goals.
- After testing we will be moving forward with the multistage option to meet our objectives.
- Next steps will be to optimize design for manufacturability and distribution within Terumo.

Criteria

- ✓ The design cannot alter the FDA regulated plasma collection bottle.
- ✓ The full system must integrate with the Rika physically and electronically.
- ✓ The air filter must **never** be submerged in plasma.
- ✓ The inlet/outlet must **always** be submerged in plasma.