

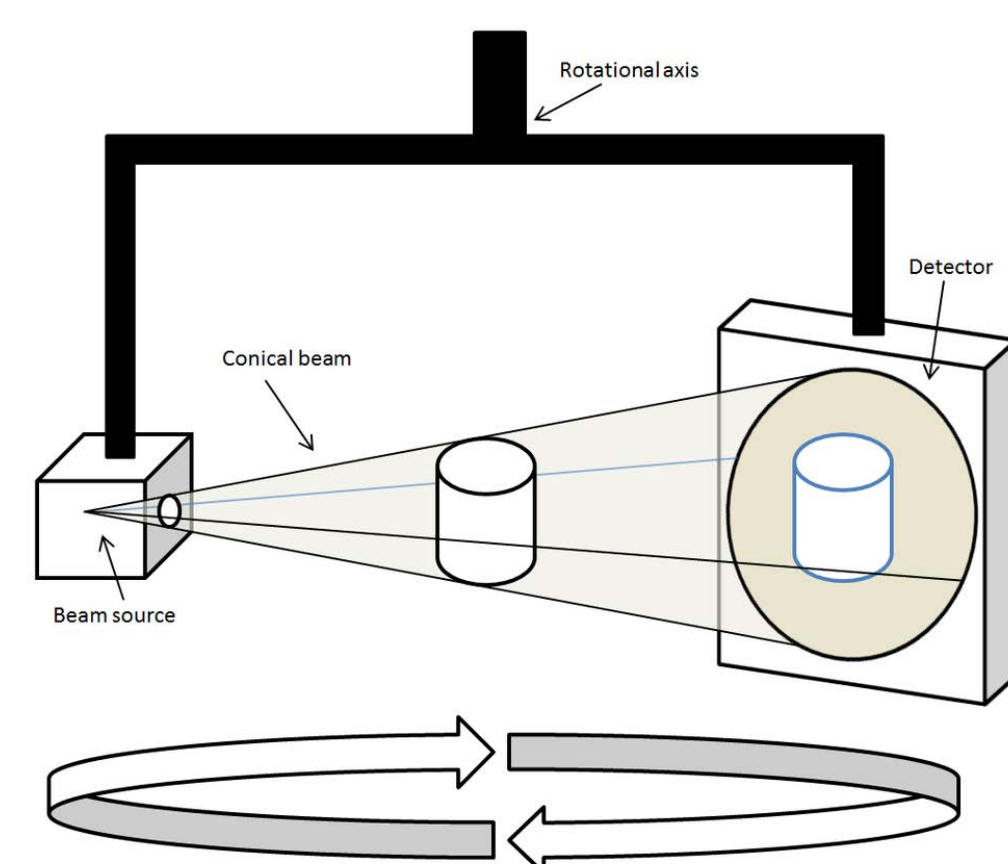
X-RAY MOSAIC | WESLEY GATES - CORY SUMMERS - DAVEY ANGUIANO - TIANA BLACK - DUSTIN TAYLOR

OBJECTIVE

Inspection of electronics for defects often results in their destruction. The goal of this project is to develop a software and mechanical package that enables non-destructive inspection of Schweitzer Engineering Laboratory's product by combining 2D x-ray images into a digital 3D model.

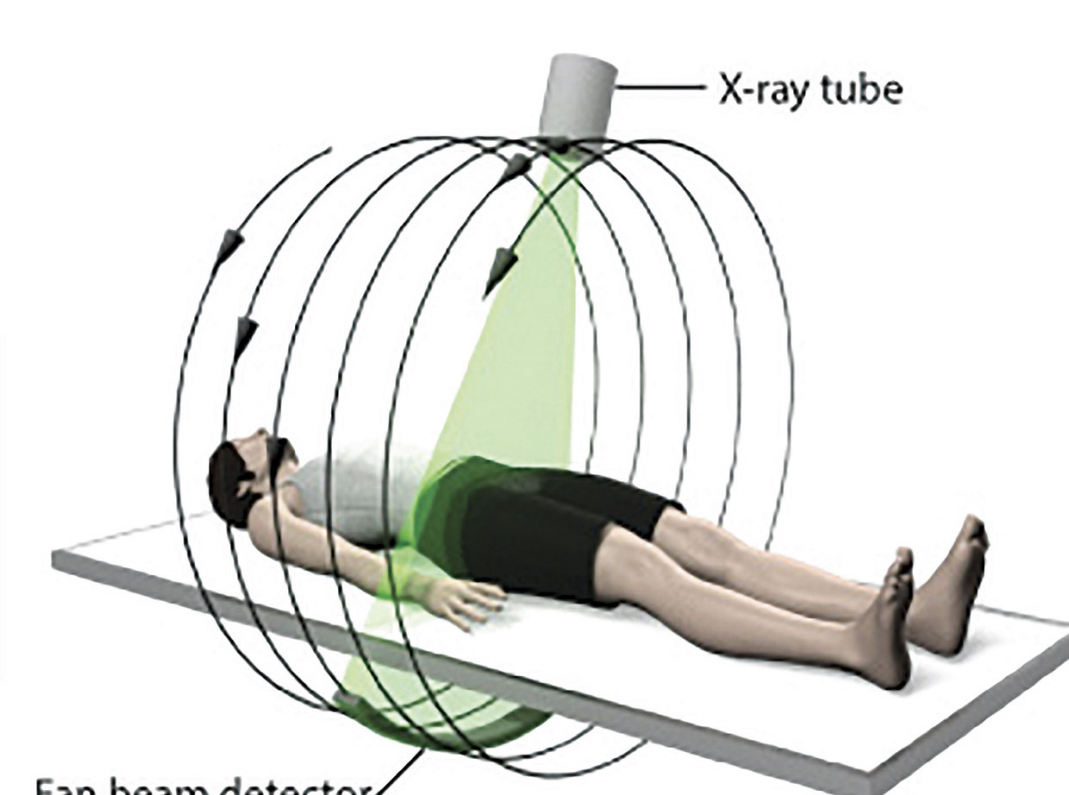
BACKGROUND

MICRO CT

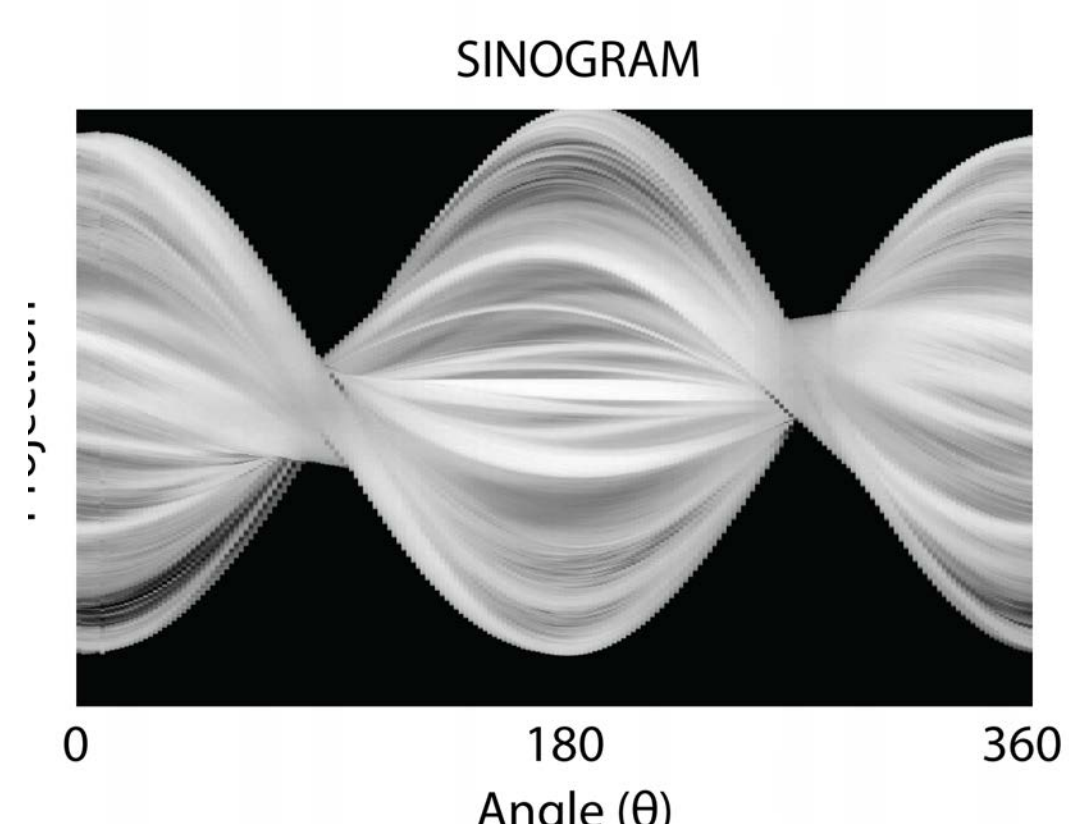
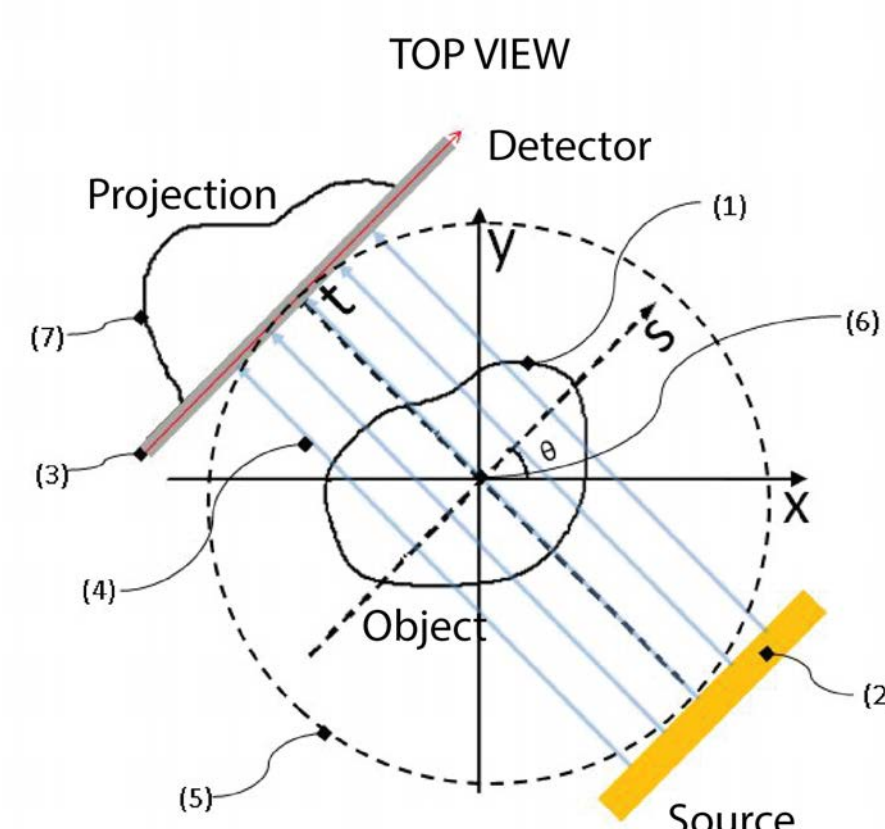


TOP VIEW OF X-RAY SOURCE AND EMITTER

MEDICAL CT



REPRESENTATION OF DENSITY OVER TIME

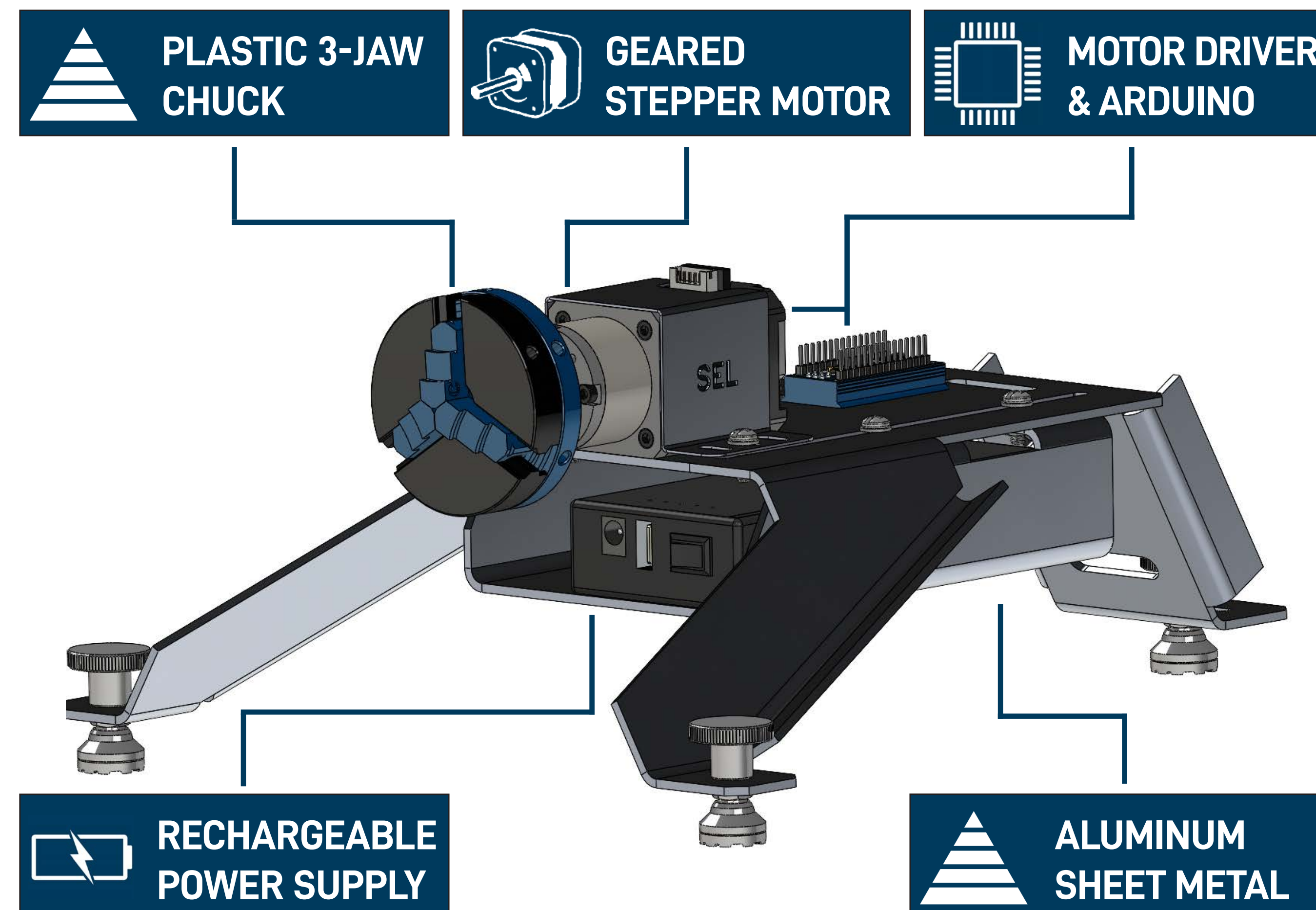


KEY PHYSICAL REQUIREMENTS

Max Sample Size	4x6	Inches
Max Wg. of System w/ Sample	5	Kilograms

KEY PERFORMANCE REQUIREMENTS

No. Images for Reconstruction	~1000	Images
Time for Samples	<15	Minutes
Battery Powered	>10	Uses/Charge
Size of Resolved	~100	Micrometers



FINAL DESIGN

STRUCTURE



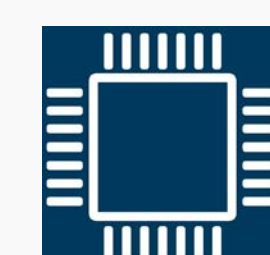
A **stepper motor coupled** with a **gearbox** offers great positional accuracy and reduced vibration.

MOTOR



The **plastic 3-jaw chuck** holds a wide variety of product shapes and sizes and is **transparent to x-rays**. **Aluminum sheet metal** houses all system components and is **durable** and **lightweight**.

CIRCUITRY



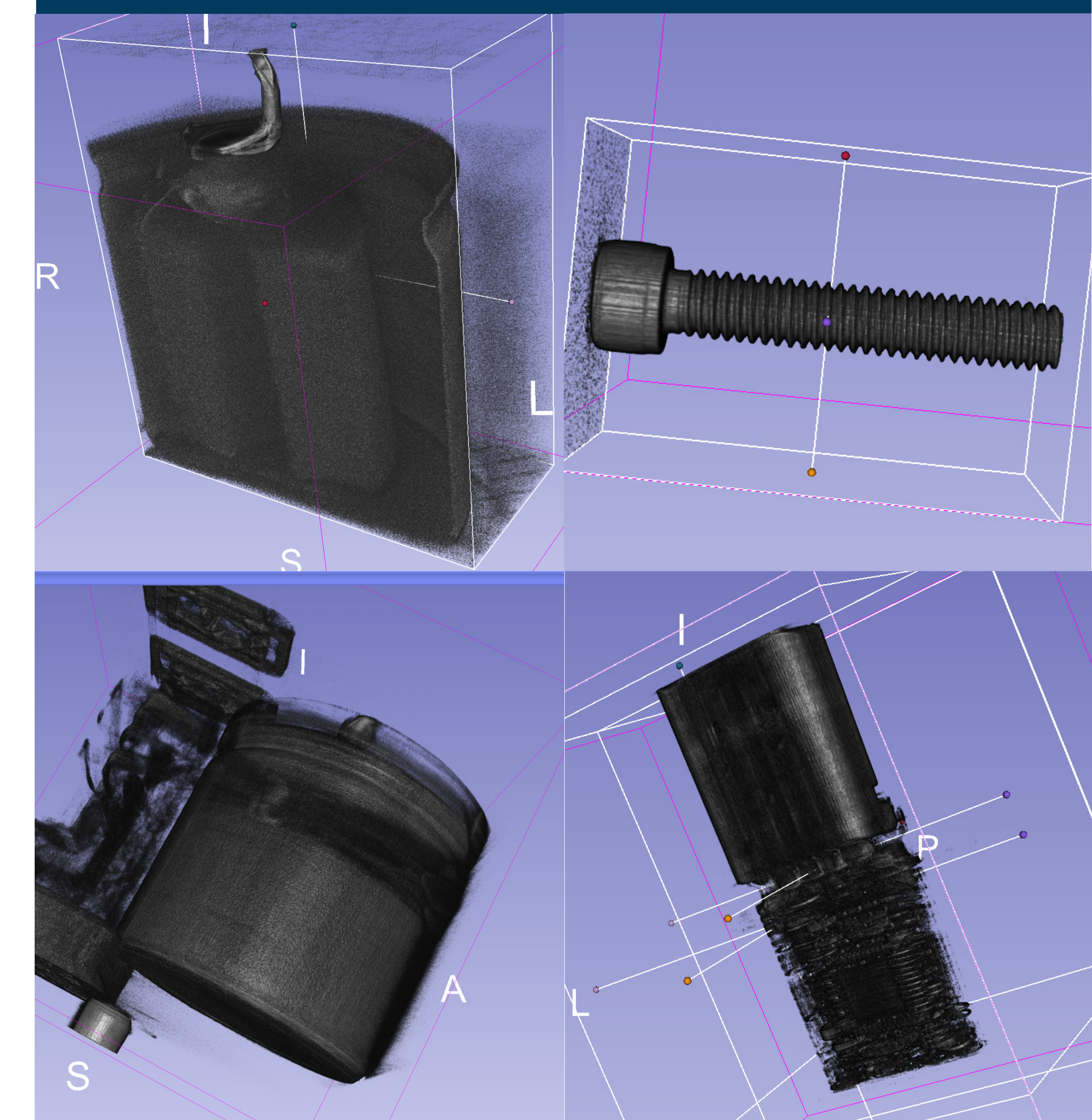
An **Arduino microcontroller** is programmed to interface with a **stepper motor driver**, which can further reduce vibration and **increase image quality** via microstepping.

POWER



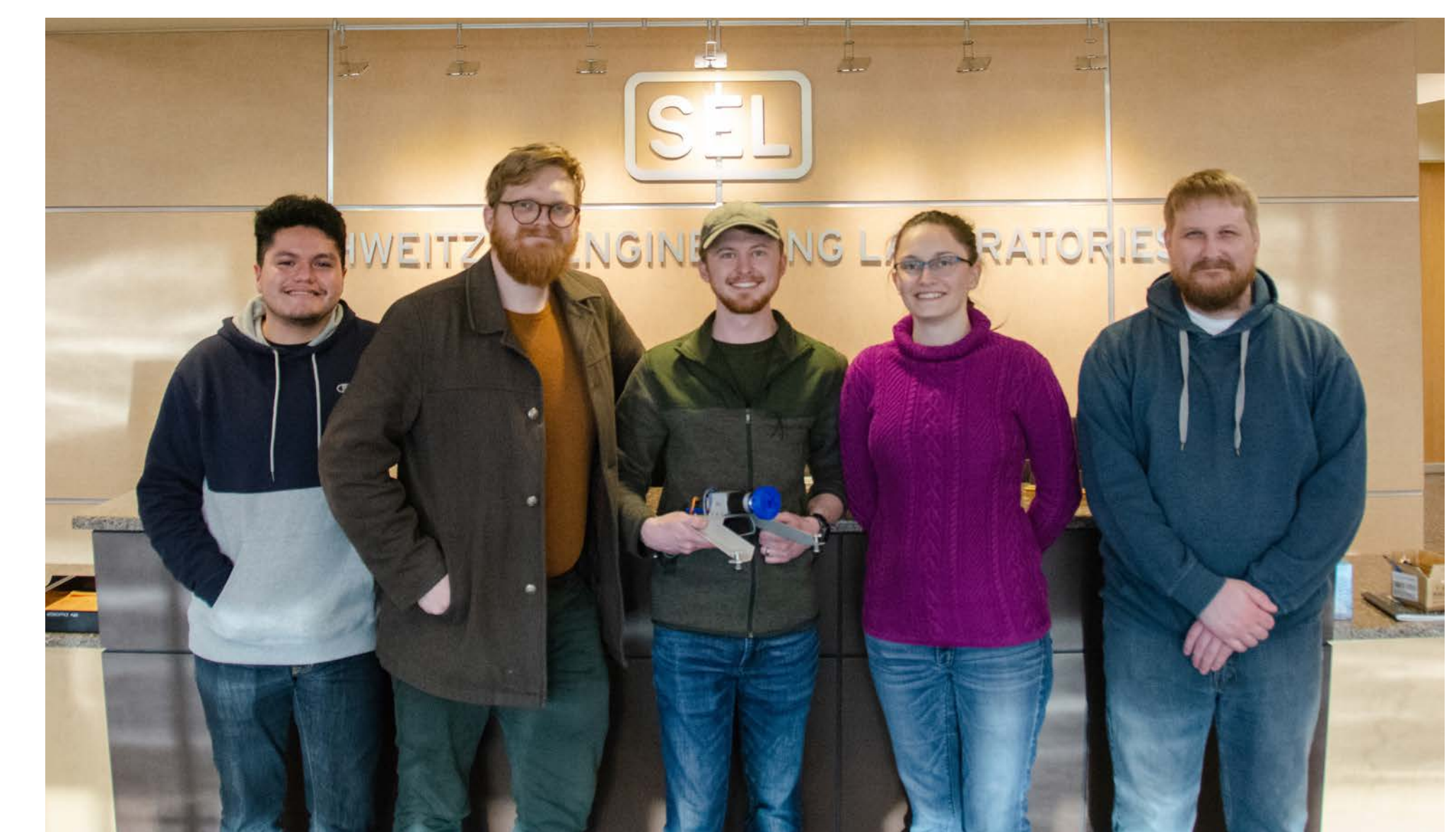
USB-C Power Delivery enables use of a simple **power bank** to simultaneously power the motor, motor driver, and Arduino microcontroller.

RESULTS



(Top Left and Bottom) SEL capacitor, (Top Right) 8-32 screw, (Bottom Right) USB flash drive

OUR TEAM



Left to Right: Davey Anguiano, Cory Summers, Wes Gates, Tiana Black, Dustin Taylor