

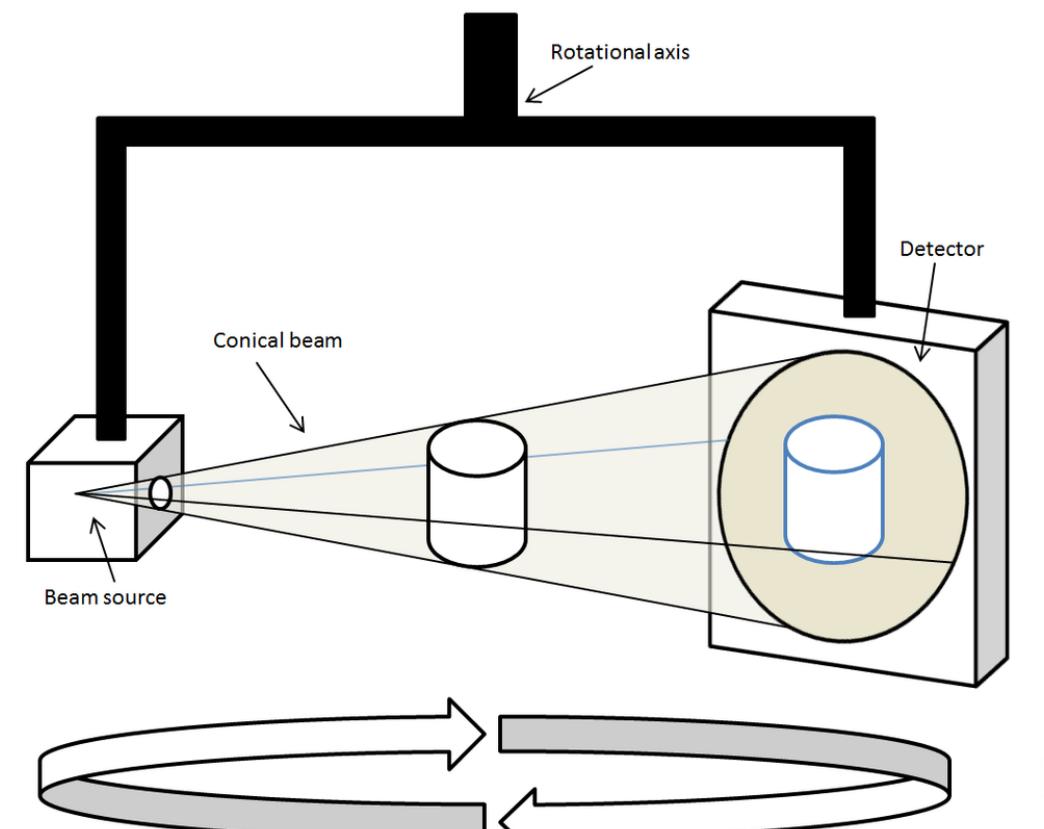
X-RAY MOSAIC | WESLEY GATES - CORY SUMMERS - DAVEY ANGUIANO - TIANA BLACK - DUSTIN TAYLOR

OBJECTIVE

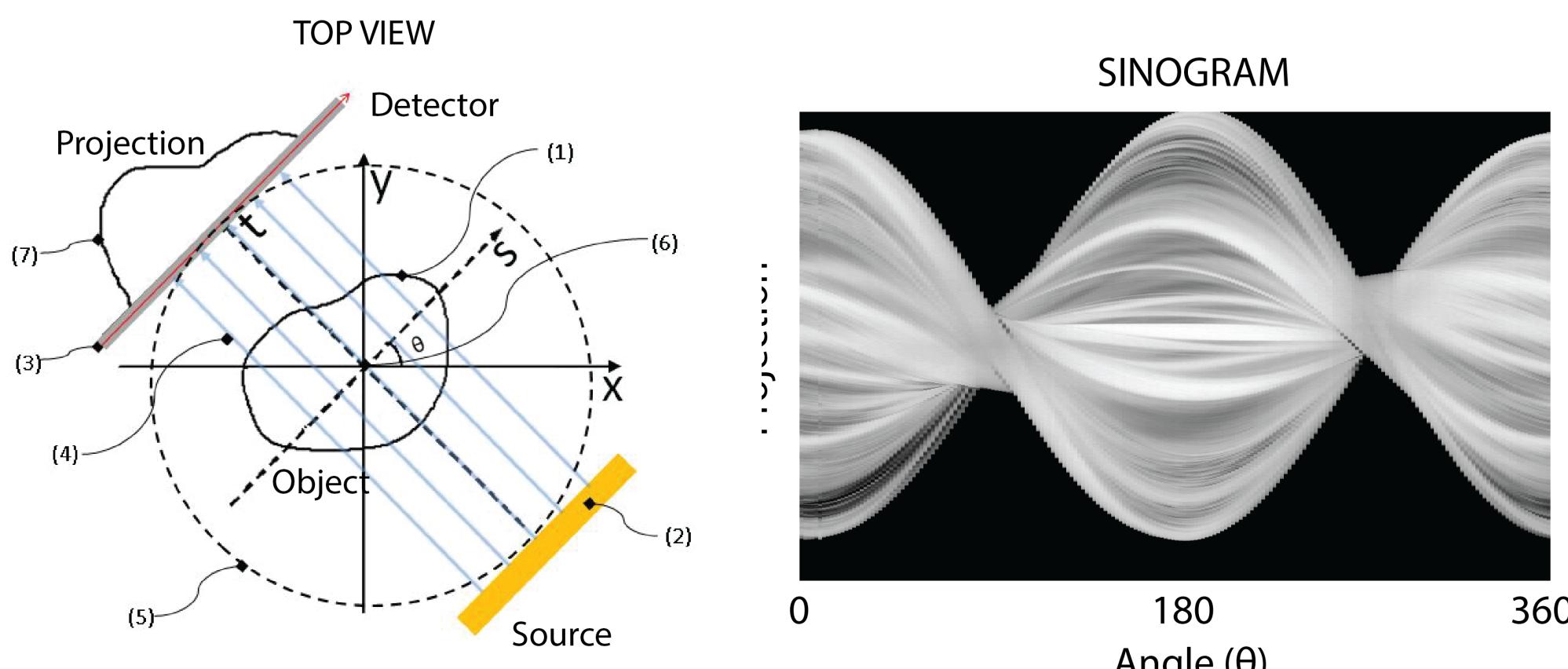
Inspection of electronics for defects often results in their destruction. The goal of this project is to develop a software and mechanical package that enables non-destructive inspection of Schweizer Engineering Laboratory's product by combining 2D x-ray images into a digital 3D model.

BACKGROUND

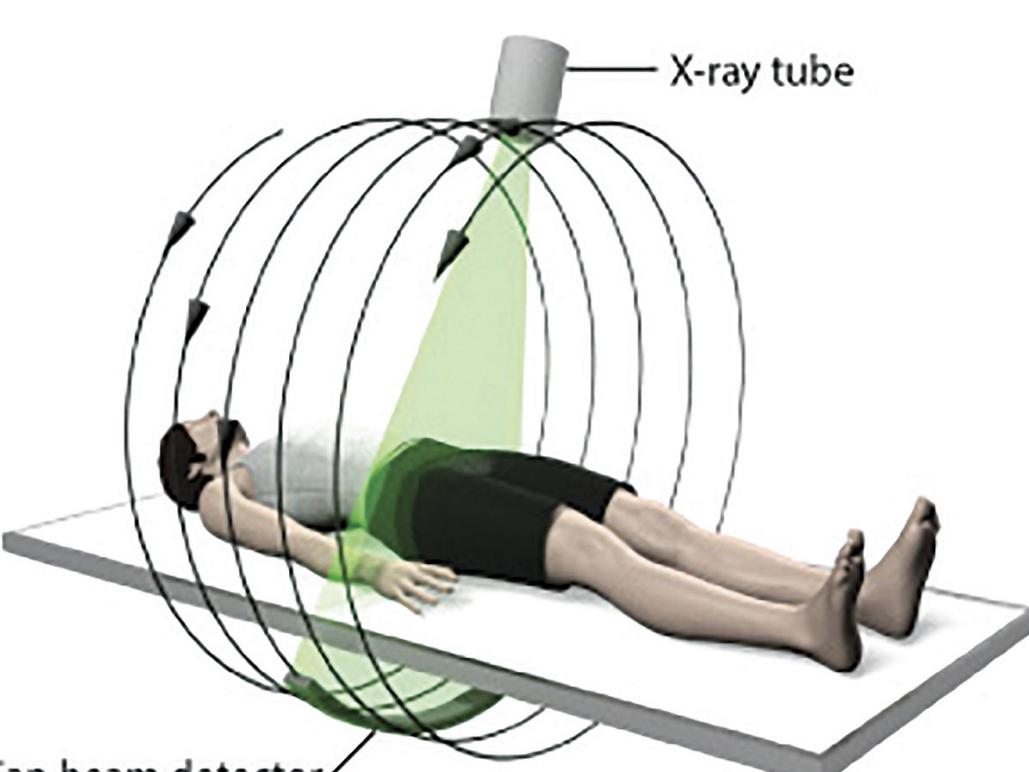
MICRO CT



TOP VIEW OF X-RAY SOURCE AND Emitter



MEDICAL CT



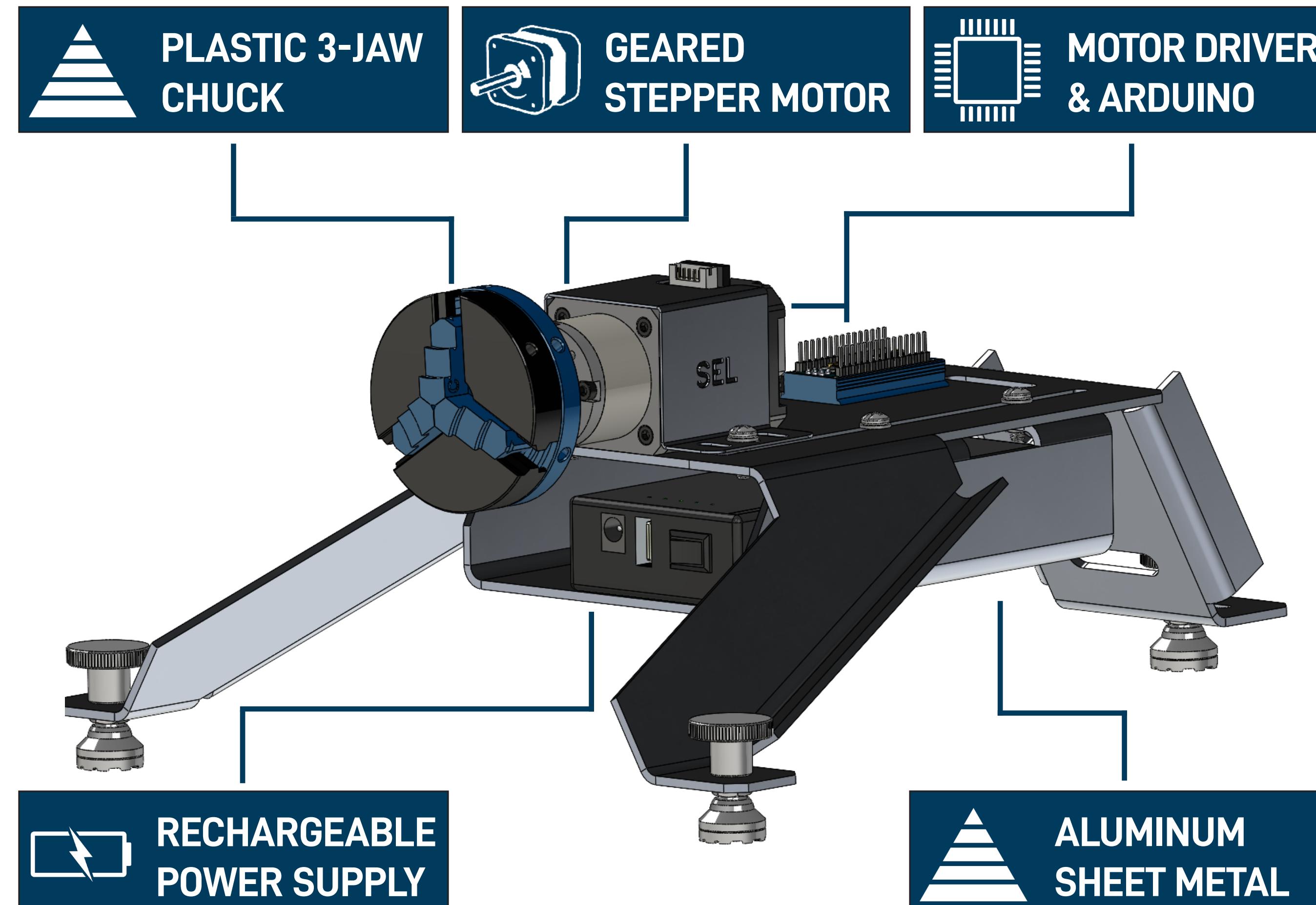
REPRESENTATION OF DENSITY OVER TIME

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



SCHWEITZER
ENGINEERING
LABORATORIES



University of Idaho
College of Engineering