Piezo Replacement on the CXI HE Sample Chamber
Ensures new Piezo stages function with the upcoming CXI HE endstation.

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**Proposed solution:** replacement for out of service life Micronix Piezo motors in the upcoming CXI HE endstation chamber using Smaract piezo stages

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**REVERSE ENGINEERING**
Analyze the lay out, purpose of each instrument and constrains each part has:

- **Constrains:**
  - Size and weight constrains.
  - Materials required to be used in a vacuum chamber.
- **Purpose:**
  - Replace Piezo Micronix motors with SmarAct Linear and rotational motion motors.
- **Layout Analysis:**
  - Each device most complement each other and allow a coherent flow.

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**MODIFYING/DESIGNING PARTS TO INCORPORATE THE NEW PIEZO MOTORS**

Redesigning process:

- Due to the different dimension, weight, and motion of the new linear piezo motor, a new constrain needed to be met and others needed to change.
- Multiple designs failed to meet all the requirements such as adapters that combine new and old equipment.
- New parts were created to accommodate the new Linear piezo motors while keeping the same constrains set by the bread board layout.

Inclusion of adapters:

- Existing parts were able to be reused with the inclusion of adapters.
  - Allows for a cost-efficient method to incorporate the new SmarAct linear motors.
  - It helps achieve height constraint due to the lack of thickness of new linear motors.

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**CREATING CAD DRAWINGS**

Modifying existing parts:

- Complex and innovative design create a unique solution that allows quick access to removeable equipment.
  - Magnets were used to connect the sample holder frame and the rotational piezo motor allowing for a strong stable connection.
  - It allows for quick removal by disconnecting a pin instead of removing bolts.

Finalizing design:

- A 2D-drawing is created to allow parts to be manufactured and to provide a final visual representation of the finish product.
- Each new part has its own 2D-drawing and if the assembly is changed, a new 2D-drawing must be made.

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**REFERENCES**


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