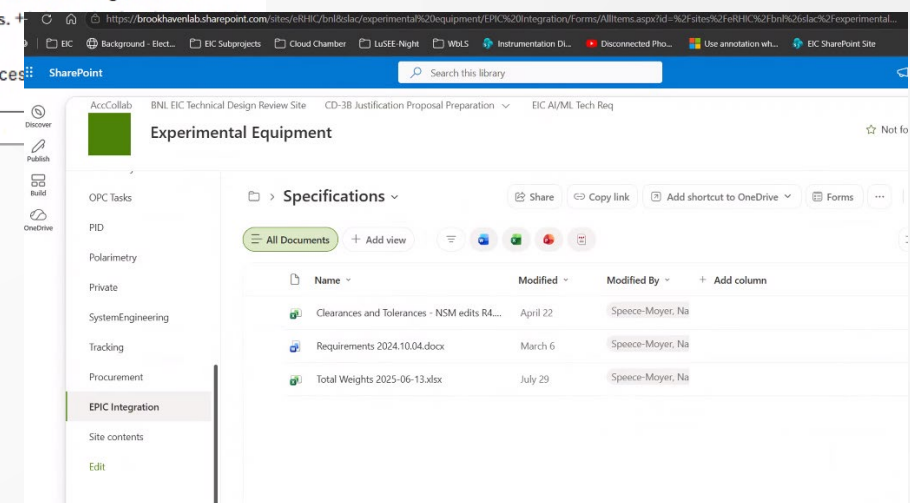


- Chat with Nathaniel - 19 Aug 2026

- Hydraulic, powerful, remote, high pressure risk
- Pneumatics, less mess risk
- Linear actuator
 - Thomson linear
 - Some back-drive under load
 - Lead screw
- Flexible drive shafts elliott engineering
- Linear-actuator.net
 - Piezo electric linear actuators precise
 - Continuous power required?
- Aerotech motion control
- Keyence
 - Fiber optic sensor
- Sdp-si.com
- Misumi-ec
- wmberg

- Global, EPIC integration, clearances and tolerances

System	Desired Postional Tolerance (mm)			Desired Rotational Tolerance (mrad)			Total Adjustment (mm)			Notes
	X	Y	Z	X	Y	Z	X	Y	Z	
Cradle	±2	±2	±2				±25	±10	±25	If there are conflicts between tolerances below, the smallest tolerance takes precedence. - Tolerances listed are measured at the beampipe, as able to be positioned by the cradle alone. - The cradle will be on solid blocks and can be shimmed
GST	±3	±3	±3				±10	±10	±10	Will likely need to install EEMCAL, measure deflection, remove, adjust, re-install
PST	±1	±1	±1				±3	±3	±5	Andy to follow up with Ben on this 11/19/25
Beampipe	±1	±1	±5	±1	±1	--				- This tolerance includes the tolerances of the beam pipe fabrication +/- 0.5 mm. The rest of the +/- 1mm goes in the position and deflection tolerances. - The beampipe rotational tolerances requirements.
Bellows									±5	Tolerance in z: +/- 5mm



https://brookhavenlab.sharepoint.com/:x:/r/sites/eRHIC/bnl&slac/experimental%20equipment/_layouts/15/Doc.aspx?sourcedoc=%7BD77725AD-AD33-406E-98C3-CEA9605F9591%7D&file=Clearances%20and%20Tolerances%20-%20NSM%20edits%20R4.xlsx&action=default&mobileredirect=true

- ◆ 4 “feet”
- ◆ Each supports ~150kg (1470N)
- ◆ Fit within 100x100x100mm space near each foot
- ◆ Remote powered
 - ◆ Electrical
 - ◆ Piezo
 - ◆ Hydraulic
 - ◆ Pneumatic
 - ◆ Mechanical linkage

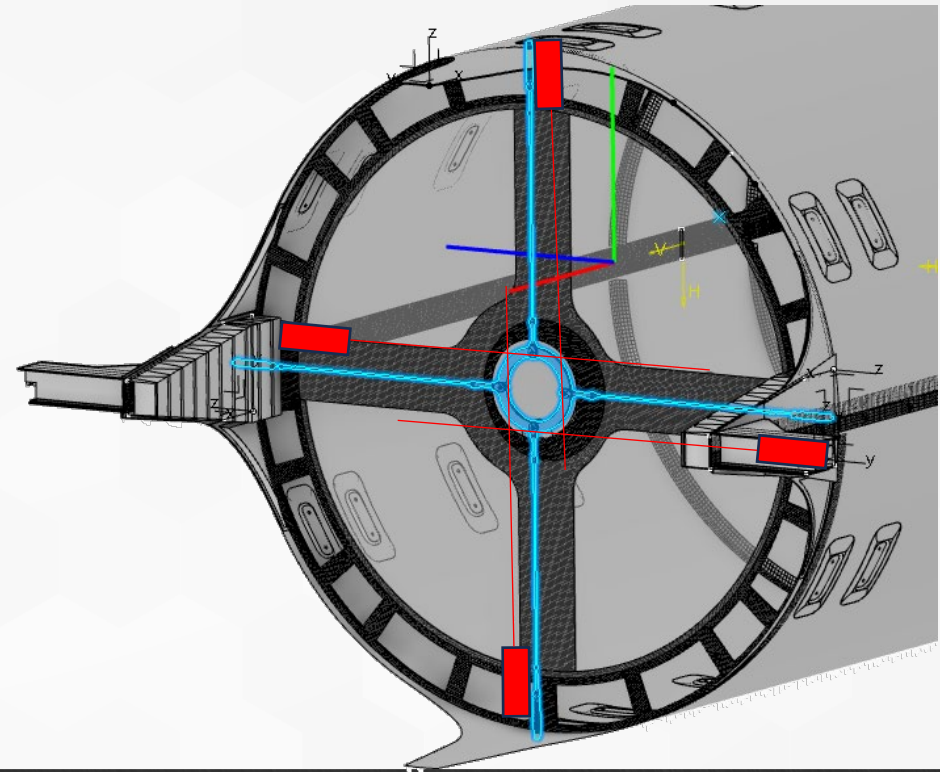
- Mechanical Components Handbook
- Illustrated Sourcebook
- Machine Devices and Components
- Dual systems
 - Primary lift to remove load (compact)
 - Lower power motor for positioner motion

- ◆ Non-contact

- ◆ Ultrasonic (~20mm min distance)
- ◆ Inductive
- ◆ Capacitive
- ◆ Laser
- ◆ Photoelectric (interference)

- ◆ Contact

- ◆ String pot
- ◆ Lever snap acting (limit switch)
- ◆ Strain gauge directly on beampipe rods/straps



1. Measure/scan open SVT half assemblies
 - ◆ Work in progress, needs images
2. Adjust disks/barrel if required
3. Place central beampipe in SVT half
4. Adjust beampipe in open SVT half
 1. Test any internal position sensors
5. Join SVT halves
6. Adjust beampipe in closed SVT