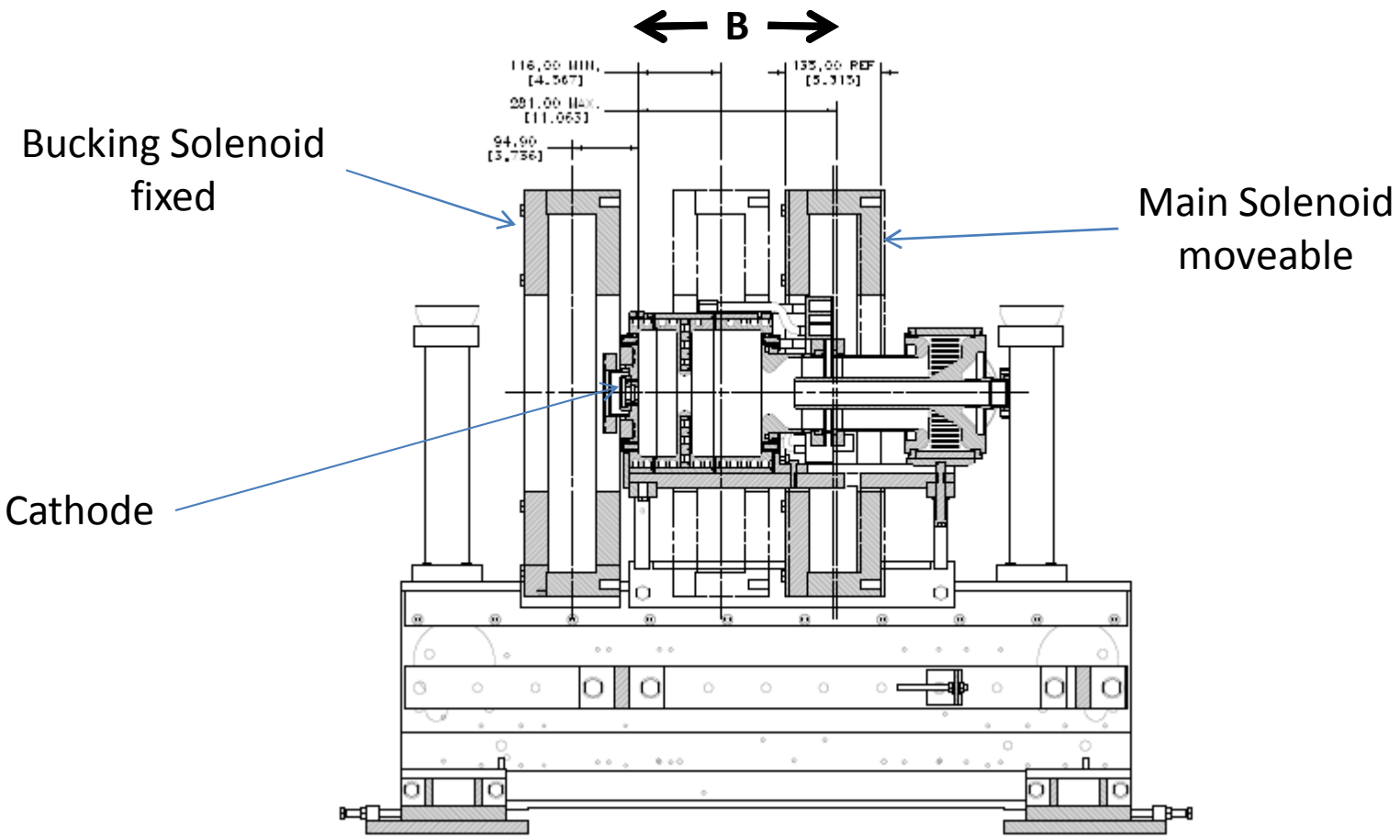
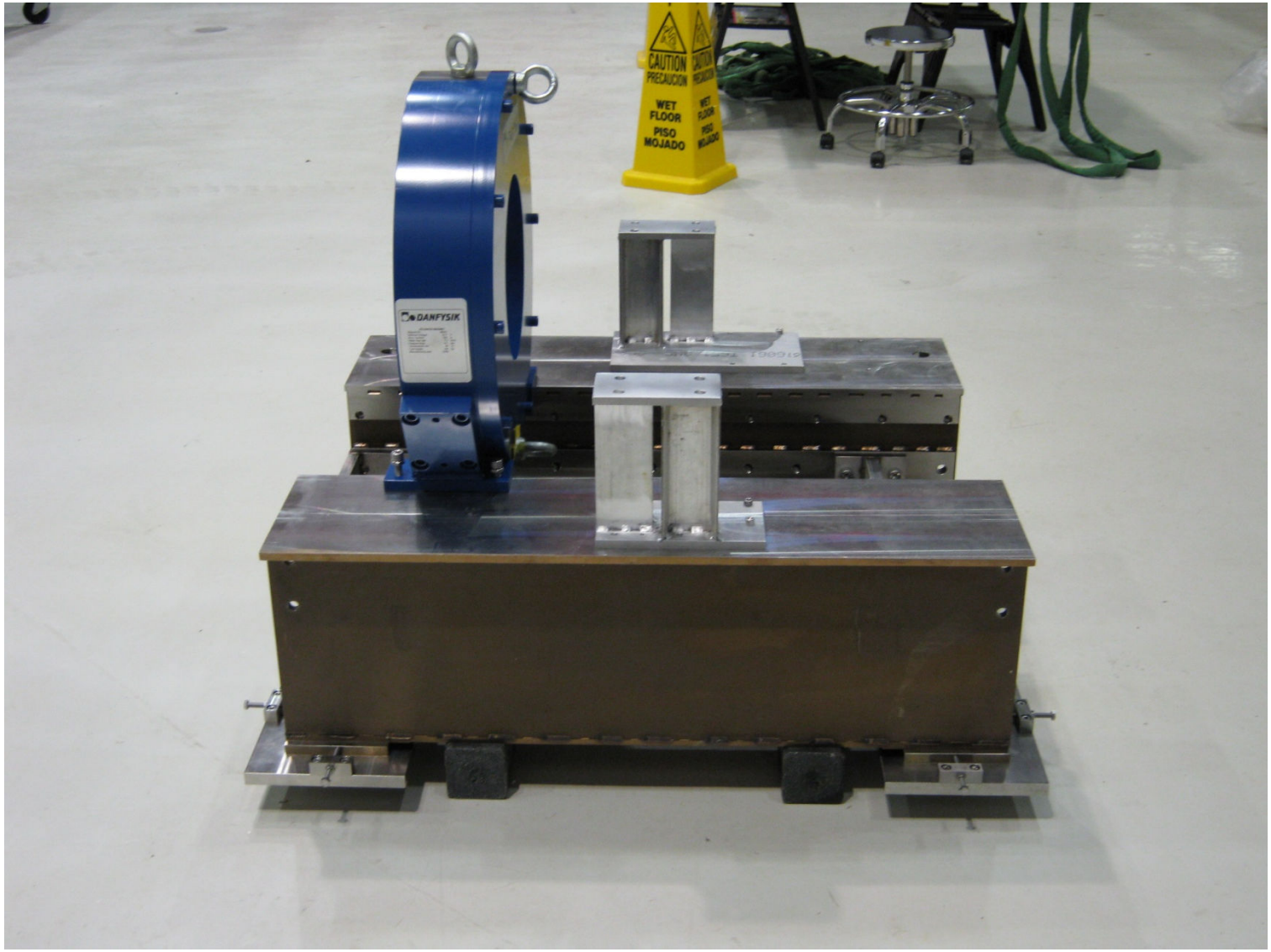
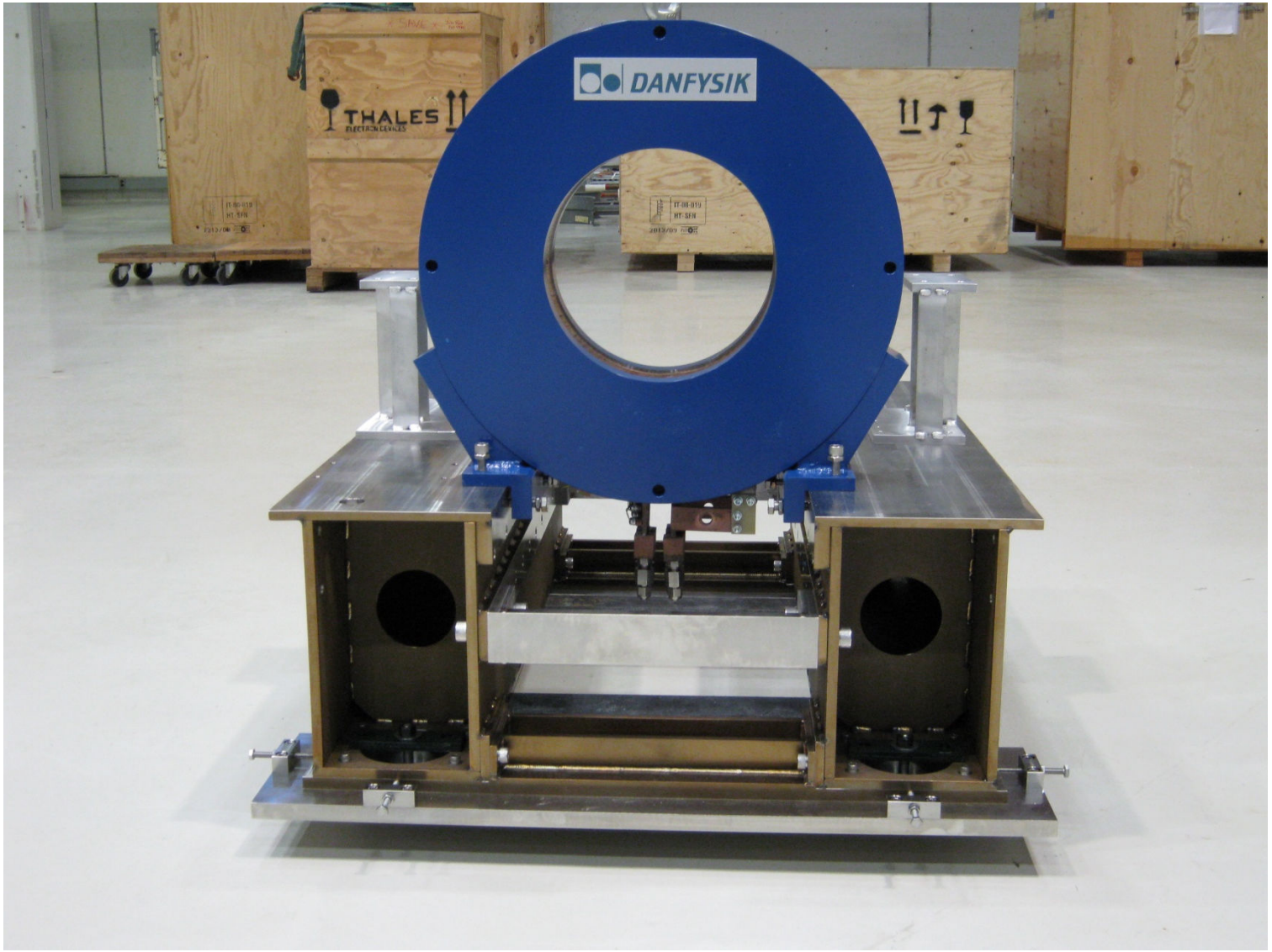
# E-Gun Solenoid Magnets Update

Dan Broemmelsiek


B
Bucking Solenoid fixed
Main Solenoid moveable
Cathode


CAUTION
PRECAUCION
WET
FLOOR
PISO
MOJADO
DANFYSIK


DANFYSIK
THALES

# Beam Based Alignment

- **BEAM-BASED PROCEDURES FOR RF GUNS**, M. Krasilnikov, et al, Pac05.
  - Measure transverse positions @YAG screen vs. main solenoid current
  - Simulate (ASTRA) result to get translations/rotations
  - Move
  - Measure and verify simulation
  - Iterate
- Initial move for VUV FEL rf gun was ~1mm *up*
- For VUV FEL rf gun, procedure gives <.1mm and ~.3mrad misalignment after 7 iterations.
- Are there alignment requirements?

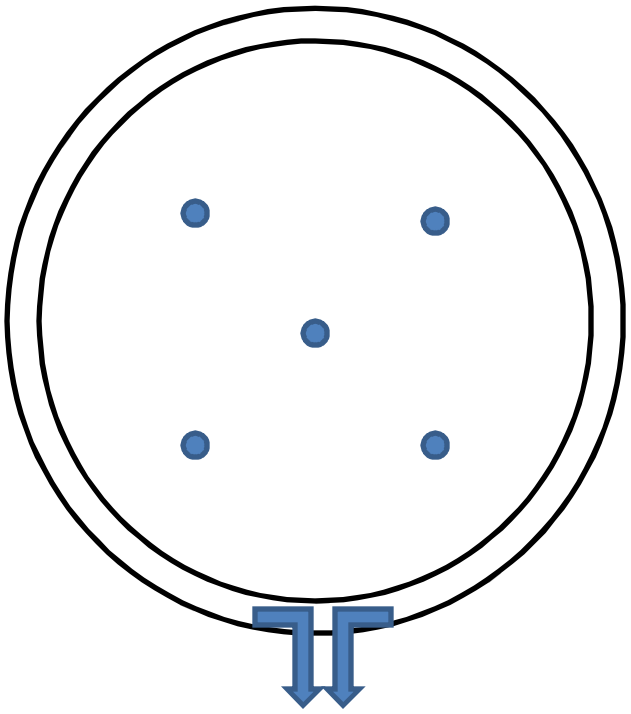
# Power Supply Ramp Test


- A zero to 470 Amp ramp can be accomplished to a stable current in 8 seconds.
- Unipolar supply
  - Hysteresis

# MTF Tests

- Determine magnetic axis
  - May change with operating point.
- Measure Bz on axis from -300mm to +800mm from physical magnet center in steps of 2mm @100A, 200A, 300A, 400A.
- Measure Bz at physical magnet center at 25A, 50A, 75A,…, 425A.
  - Repeat for hysteresis

# Stretched Wire Tests



- the field is sampled about 40mm off-center at ± positions and the wire is positioned so that the flux in the ± regions balances (we sometimes refer to this as a 'moving wire' technique)
- an AC current is placed on the wire and it is scanned through the aperture to a point where it feels no force (known as the vibrating wire approach)
- VW consistent with mechanical center
- MW 1.6mm higher
- .25mm resolution

# Summary

- Fast ramping, low inductance
- Assembling micro-movers
- Bucking solenoid magnetic axis measured.