

# GRID CLEANING STATUS

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*Rachel Mannino*  
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# GENERAL GRID CONSTRUCTION TIMELINE

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1. Grid ring is electropolished at Advanced Electropolishing.
2. Hand clean grid ring and bring to cleanroom.
3. Weave grid and glue rings in cleanroom.
4. Take grid to Advanced Electropolishing for electropolishing (EP) and then passivation.
5. Send grid to Astropak for cleaning.
6. Take clean grid into Phase II cleanroom for HV testing.
7. Pack grid up to send to SURF.

# ASTROPAK CLEANING

- Grid shipped in its grid transportation box [see Figures (a) and (b)] to Astropak.
  - Plan to keep the grid in its box during cleaning to reduce risk of damage.
- Hold to “visually clean” standards
  - Not as stringent a standard as extraction sampling
  - Recommended due to fragility of the grid wires.
  - Equivalent to  $\sim$ Level 100 ( $\sim 5 \text{ ng/cm}^2$ )
    - Requirement:  $500 \text{ ng/cm}^2$  for all surfaces.
- 2 Methods for “visually clean”:
  1. Ultrasonic bath. Astropak cannot heat its ultrasonic bath, and isn't large enough to clean the entire grid in one go. Need to do 1/2 of grid, then rotate it to do the other grid.
  2. Spray grids with low pressure spray and rinse.

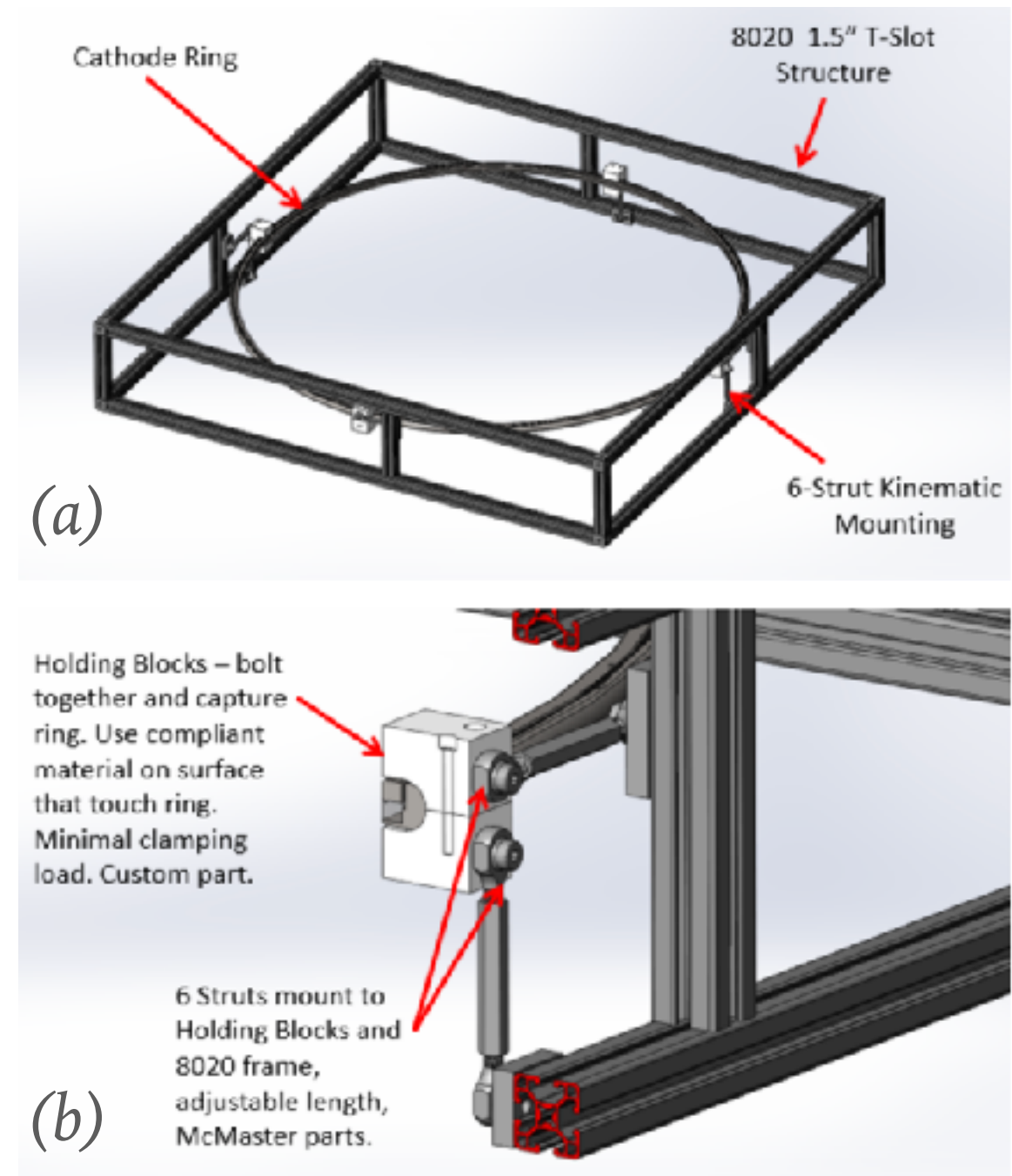


Figure: (a) Grid holding box constructed of 8020 T-slot. (b) Grid ring supported by plastic holding blocks. Designed by Andrew Lambert (LBL, version from 12/8/17).

# THE 1/3-SCALE GRID

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- A 1/3-scale grid was built to test weaving a larger grid than the Phase 1 system test.
  - Diameter = 52.7 cm, 100  $\mu\text{m}$  diameter wires, 0.5 cm pitch, 304 SS wires.
- The 1/3-scale grid will be electropolished to test the effect of electropolishing a larger scale grid.
  - Expect that resistance of the grid wires will cause less material removal on wires near the center of the grid leading to a radial dependence on the resulting wire diameters (and thus the electric field on the wires).
  - After electropolishing 1/3-scale grid, wire diameter measurements can determine whether this effect occurs.

# ASTROPAK CLEANING OF 1/3-SCALE GRID

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- Send the 1/3-scale grid to Astropak to let them test cleaning methods on a large, but not crucial grid.
  - They can test the “visually clean” methods on some of the same grid wires ( $100\ \mu\text{m}$ ) used in LZ.
- Once the 1/3-scale grid returns from Astropak, we can inspect grid wires using a microscope to determine if damage occurred.
  - Examples: Wires shifting to change the pitch, tooling marks, broken wires from handling, dust deposition, etc.
  - May be able to quantify dust on the wires.

# CURRENT STATUS

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- Aaron will arrange a meeting with Astropak which includes us to discuss:
  - 1/3-scale grid
    - Cleaning treatments Astropak can use
  - Ultrasonic, passivation, etching capabilities
  - Freshness of bath,
- Upcoming electropolishing test of the 1/3 scale grid gives data about possible radial dependence of wire material removed.
- Upcoming samples of the EP and passivation baths at Advanced Electropolishing gives data about the cleanliness of these baths.