**Things that are broken at UITF, or could be improved upon**

1. BPMs don’t report the same orbit in tune mode and CW. And BPMS report beam (i.e., wiresums) when there is no beam
2. BCM outputs (have cavities, need receivers)
3. Laser power is very small. OK for bulk GaAs and keV Mott, but not enough for a program with superlattice photocathodes
4. Move the laser under the table inside the enclosure? That’s what I would do, eliminate the fiber. Would need to work with SSG to maintain all the PSS hooks.
5. Laser power drift (temp cycle of the room AC?), but the current lock can deal with this, so not actually a problem when beam arrives at a cup or dump. Maybe a problem for Wastewater Treatment
6. Install an insertable halfwave plate to flip the sign of the polarization
7. Electron beam optics not presently good, there is beta mismatch across the booster
8. The optics modeling program should tell us beam size and aspect ratio at each viewer, so we have something to work towards
9. M703 harp doesn’t work
10. Need specialized shielding at insertable cups
11. Viewers were not always installed at useful Z locations. What is a useful location? At a beam waist. “Viewers at nodes, BPMs at anti-nodes”
12. Mu-metal
13. Replace manual valve VMVM401 with fast valve
14. Remove Rogowski coil #2 from beamline
15. Did the yao cavity get damaged during one of the bakeouts? Pull it and check it out
16. Move Faraday Cup 3 to downstream viewer cross? Not adjacent to control room, that’s the point here, where radiation levels are problematic
17. More concrete shielding!
18. Consolidate the locations of steering magnets? Put them where they need to be
19. Update the Operational Restrictions page to reflect RadCon shielding assessment, maybe I did this already?
20. I am uncomfortable with the amount of lead stacked on the keV dump structure
21. What was the point of putting BPMs on the elevated beamline? Did we think they would see 1nA beam? I guess we just thought tune mode up there….
22. Need a beam loss accounting system; MPS BCM cavity or PSS BCM but this is a much bigger project (can’t we just buy a system from SLAC, or duplicate it?)
23. I need to learn how to use qsutility and set quads
24. Need a supply of large haimson steering magnets on the shelf (five sets should arrive soon)
25. More UHV supplies, another set of them
26. Polarity of magnets not all correct, and some H/V labels are incorrect
27. For regions that get vented frequently, there should be flange mounted NEG pump
28. The buncher heater control is primitive, just a local heater with feedback. There is epics temperature readback, but no epics interface to the heater control.
29. Wouldn’t it be easier to use a 200 W solid state amp to drive the 2-cell? Forward power today is only 40 W, the 2-cell is not meant to be driven hard.
30. Complete microphonics assessment, install vibration isolation pads?
31. Microphonics diagnostics should be available when running beam, so that when problems are encountered, we can see immediately if there’s a correlation with microphonic vibrations. At the moment, we can only assess microphonics from inside the cave, when the beam is OFF
32. Better rf quality to 2-cell?
33. Do the piezo tuners do anything? Why not?
34. Cameras that can be line-synced, then we could use them to look for 60 Hz motion.
35. Global Channel Access button doesn’t work, it would be nice to have
36. UED remains a mystery to me, and from what I can tell, to most everyone else too, even people in software know little about it. Who does what? Whose responsibility is it to update UED? How does one actually do that? Maybe two people know the answers.
37. Probably need a beacon or locked door to the aisle way above UITF (where we store stuff), or at least verification from RadCon that it’s ok to access this space when running beam. Or maybe it’s safe to go back there when running beam?
38. A3 should be closer to booster in order to protect the booster and define the launch
39. I think the booster should have been a low Q design to make it more reliable.  I am not expert on this topic, but high Q is important for long linacs that present a large cryo burden.  The booster does not pose a large cryo burden - we should have forgone Q for reliability.
40. Need a professional rapid access beacon/system at entry way to the enclosure
41. Closed circuit cameras inside the enclosure
42. Photogun and keV beamline:
    1. The photocathode lifetime at UITF is REALLY bad, the field emission at 200 kV certainly doesn’t help (is it the sole problem?).  So take apart gun polish electrode, krypton process until there’s NO field emission
    2. Align the gun so that the cathode AND the anode are at normal incidence relative to the beamline and trajectory
    3. Align the rest of the beamline
    4. Fix the chopper slit (Kurt Lesker says we just need a 50:1 gear box, I’ve ordered it)
    5. setup the chopper phases, use the chopper
    6. at the chopper chamber, VIPK301 ion pump not energized, it is just spewing CH4 into beamline, replace it
    7. Add load lock to depo chamber (I have cross and manipulator)
    8. Modify depo chamber to include new chemical sources
    9. Attempt to better align the mask
    10. Polish the schneedle (is it aluminum? Should be steel, right?, no silver plating required (in fact, it’s bad), polish the interior of all pucks)
    11. Add the polarimeter
    12. A3 is in the wrong place, at least in terms of protecting the booster
    13. Beam appears far right at ITVK203A, beam appears far left at ITVK401, maybe the alignment of the beamline will help?
    14. Install vertical Wien
43. We need a map of our network connections, what is the network layout now at UITF? Do all network connections go through the rack behind the laser room/control room. Are they all owned by Accelerator Division. I think we have a combination of IT and Accel network routers
44. Ready for ItoVs
45. BNC spigots for triggers: pockel cell and gun mode
46. Boards that convert electrical to fiber and vice versa
47. Need audible alarm handler notification
48. Audible FSD notification
49. Improve the screens, streamline them
50. Quality check: UED/Songsheets/Quick Reference all need to jive... System owners (mainly engineering) responsible for UED updates, ops liaison/geographic integrator/apel responsible for making sure the other 2 jive with reality and making changes.
51. Valve based nomenclature a bit confusing, but at this point we're probably stuck with it... effort to change too high for benefit
52. A yao or some manner of cavity to measure bunch length etc. before FC#2 would probably be handy longer term for setup.
53. Screens need some work: Build a tools screen, continue to improve RF screens, maybe revise some of the others to trim real estate from them so there is not so much gray space unused and you can fit more on your work space. Build a wall screen.
54. Quench protection circuit in Booster needs troubleshooting
55. Implementation of FSD fault when cavity goes from GDR > SEL
56. Low level software support to interface warm RF SSAs into EPICS when convenient.
57. FSD segment masks need to be set up for each of the different destinations