# Downstairs Elab - Discussions and Planning

## Materials needed

### Must have (so we can move downstairs)

| What | Where | Cost |
|---|---|---|
| Shelving above workbenches 3x 16' x 12"  2x 8'x4' 1/2" plywood | Home Depot | $90 |
| Shelf brackets, ~48?x 10"x12" | Home Depot | $157 |
| Screws for mounting shelves (#7 1-1/4" and 1/2" | Home Depot | $20 |
| Workbenches on casters, 4x 4' | | $900 |
| Heavy duty shelves, 3x 4' | Home Depot | $450 |
| Miscellaneous storage, hardware etc. | | $200 |
| Floor sealer (~500 sq ft) | Home Depot | $150? |
| **Total** | | $2000 |

### Should have (so we can use the new lab to its full extent)

| What | Where | Cost |
|---|---|---|
| 2x twist lock outlets on ceiling incl. installation | | ? |
| 4x 9x power strips | Harbor Freight | $80 |
| Misc. tools and materials for assembly kits (soldering station, 3rd hand etc.) | | $600 |

### Nice to have (what we always wanted 😉 )

| What | Where | Cost |
|---|---|---|
| Reflow oven | | |
| Digital oscilloscope | | |
| | | |

## Mar 11, 2024 |  Translating the Electronics Night meeting notes into a planning document.

I've taken the below notes and translated them into a planning document.  Please click on the **LINK HERE** to be linked to the spreadsheet.  Please let me know if anyone has more comments.  Regards, Mark

Latest Version of the ELab Draft Program - V1.0.gsheet

| Area | Description | Activities | Equipment | Power / HVAC / Lighting Requirements | Adjacencies |
|---|---|---|---|---|---|
| Whole E-Lab | | | ▪ Single, small-form factors computer<br>▪ Dual monitors with selectable inputs. Like classroom TV<br>▪ Projector & surface<br>▪ Whiteboard to draw upon<br>▪ Prometheus Board (wish list) | ▪ Need to keep Rh within limits (?)<br>▪ At least one (1) 20amp circuit with two (2) quad outlets separated such that we can plug in at least two (2) fused power strips for various equipment<br>▪ Would prefer two (2) 20amp circuts | ▪ Classroom - Room to spread out onto tables |

| | | | | | |
|---|---|---|---|---|---|
| Fabrication & Assembly | ▪ Individual work on projects<br>▪ Collaborative area that we can work face to face<br>▪ Space to work on microcontrollers and SBC projects | ▪ Assembly for small projects, putting pieces together and /or putting pieces into project boxes or containers (ie., rockets, robots, etc., etc.) | ▪ 30"x60" work surfaces<br>▪ Static dissipative, grounded surface.<br>▪ Hard surface for cutting, pounding, heating, etc. (needs to be durable)<br>▪ Handtools nearby - pegboard or clearly labeled bins or drawers (will have to decide on what tools this means) (see * below)<br>▪ Ethernet hard drop(s)<br>▪ Two soldering stations;<br>  ▪ one higher end (rework and more) and<br>  ▪ one general purpose<br>▪ Pano-vices / Chip Holders, e.g. KOTTIO Holding Hands<br>▪ PCB preheater - 110v 600watt, e.g. this one<br>▪ Hot Air Rework Station<br>▪ Reflow Oven | ▪ Where do we ground to?<br>▪ Filtration or Ventilation for soldering and/or solvents<br>▪ Ambient Air Temp - between 68 and 72degrees<br>▪ Moveable task lighting<br>▪ Soldering stations will need ventilation or filtration, e.g. KOTTO Solder Smoke Absorber | ▪ Classroom or large table area for group events - Groups, Teams, Presentations (KidWind, Rocket Teams, Robot Teams, etc.)<br>▪ Flexible in configuration to accomodate different sized things |
| Testing | ▪ Use of test equipment to measure performance of products | ▪ Testing of proto-type products | ▪ Ethernet hard drop(s)<br>▪ 30"x60" work surface<br>▪ Binocular magnifier<br>▪ Electrical Cords<br>▪ Testing banana cables<br>▪ 30v 10a power supply<br>▪ Dilip's dual power supply<br>▪ (2 Leader tracking power supplies)<br>▪ (HP power supply)<br>▪ Signal Generator (Questionable to keep)<br>▪ Spectrum Analyzer (Questionable to keep)<br>▪ Oscilloscope (Very much needed)<br>▪ Wall Warts - Standard set of 3.3v, 5v, 12v<br>▪ Static dissipative, grounded surface.<br>▪ Analog Monitor - to attach to Oscilloscope | | Wholly within the Elab |
| Demonstration | ▪ Collaborative area that we can work face to face | | ▪ Arduinos, RaspberryPi's, CPX's<br>▪ Breadboards, hook-up wires<br>▪ LED's, components<br>▪ Ethernet hard drop(s) | | May have to spill out to Classroom |
| Education | ▪ Space for presentation of electrical concepts, technologies and equipment<br>▪ Collaborative learning area<br>▪ In-person/Virtual Meeting /Classroom | ▪ Soldering 101 events<br>▪ Take-a-part events<br>▪ Build-a-circuit events<br>▪ Conduct dual format workshops<br>▪ see more ideas in list below | ▪ Kits and Equipment to support regular events.<br>▪ Multiple soldering stations<br>▪ Worksurfaces like the desks in classroom<br>▪ See Kit listings below | | Spread out broken stuff to DIY fix stuff |
| | We'd suggest implementing four identical 'virtual meeting' setups to conduct in-person and virtual workshops at the following locations:<br><br>▪ Leesburg upstairs<br>▪ Leesburg downstairs<br>▪ Purcellville Green Room<br>▪ Purcellville lower classroom | | ▪ cameras<br>▪ computer(s)<br>▪ software | | |

| | | | | | |
|---|---|---|---|---|---|
| Storage | ▪ Small Parts Storage (LEDs, SMT parts, resistors, capacitors, MOSFETs, etc.)<br>▪ Large Parts Storage (Project boxes, heat sinks, cableing, wire, etc.) | ▪ Sorting of parts<br>▪ Labeling of parts boxes<br>▪ Placing boxes in order | ▪ Cubbies and/or Racks<br>  ▪ (3 Grey Units)<br>  ▪ (1 Bin Rack)<br>  ▪ (6 tool boxes)<br>  ▪ (drone parts)<br>  ▪ (robot parts)<br>▪ Racks, Closets, Shelves<br>  ▪ (2 door cabinet)<br>  ▪ (10 Black & Yellow Boxes)<br>  ▪ (2 wire racks)<br>  ▪ (bookcase for equipment manuals)<br>  ▪ (large diameter shrink wrap and long tubes) | | ▪ Wholly within the Elab or immediately adjacent<br>▪ If located in Classroom, Classes can't block access to stuff in storage |

## Assembly kit

- Flush cutters
- Wire strippers
- Tweezers
- Dental picks
- Screwdrivers
- Bench sockets
- Small notebook
- Pens, pencils

## Soldering station kit

- Solder wire
- Solder station tips
- Solder suckers
- Braided wire
- Shrink wrap
- Flux dispensers
- Jeweler's magnifier
- Soldering station
- Sponges (natural & brillo)
- Tip tinner

## List of potential classes or workshops

1. Home Automation
2. Home Networking
3. Raspberry Pi Projects
4. Arduino Projects
5. LoRa Projects
6. Self-paced electronics projects
7. Radio Projects
8. Solar Projects
9. CNC Foundation

# Mar 7, 2024 | Electronics Night Meeting to discuss what Electronics Lab wants to be when relocated to Makersmiths-Leesburg downstairs

Attendees:

Oliver, Mark, Allon & Alisha

Notes

- Do a needs assessment first.
  - Test Equipment - What test equipment do we want downstairs?
    - Grounding Requirements - Avoidance of static electricity
    - Wall warts - Standard set of 3, 5, 12 volt power supplies
    - Set of banana cables separated into type
    - Anti-static mats on each table
    - Hot Air Rework Station
    - Reflow Oven
    - Power Supply (ies) - Single Output (30v 10a), Dilips' Dual Output ( ??), (Two Leader Tracking power supplies and and one HP brand PSs)
    - Signal Generators? 2 of them (??) - Questionable to keep
    - Spectrum Analyzer? 1 (??) - Questionable to keep
    - Oscilloscope 1 (??) - Yes, Yes, Yes Very much needed
    - Any other equipment?

- Computers
    - Single linux-based small form factor computer, maybe?
- Monitors
    - Projector or Prometheus or whiteboard
- Soldering Station(s)
    - Two soldering stations; one higher end (rework and more) and one for general purpose, solder suckers
    - Consider filtering or exhaust nearby
- Other Equipment?
    - Flush cutters, wire strippers, tweezers, dental picks, screwdrivers, bench sockets,
- General Lighting? - LED 2x4s
- Any Task Lighting? - Task specific lighting on at least one bench
- Any special requirements, such as exhaust for soldering or SMT work?
- Humidifier or Dehumidifier? - Keep it within certain Rh limits
- How many people at a time? - Optimize for two, any more, we'll spill over into the classroom.
- Test Equipment - list of pieces and dimensions of them. Also consider where electrical cords go…
- Binocular magnifier(s)
- Storage Requirements
    - Three Gray Units
    - Bin Rack
    - Two Door Cabinet
    - Wire Racks
    - Bookcases with equipment manuals
    - Large diameter shrink wrap and long tubes
    - Tool boxes
    - Drone Parts
    - Small Hardware Bins
    - Black and Yellow boxes
    - Parts Bins
- Storage Shelves and/or Racks
- Work surfaces
    - Hard surface - cutting, pounding, heat, (needs to be durable)
    - Static Dissipative, grounded surface (where do we ground to?)
- Hand tools - pegboard or clearly labeled bins or drawers
    - Will have to decide on what tools this means
- Breadboard(s), jumper wires in all combinations,
- Arduinos and RaspberryPis
- What will be electrical requirements for
- What are lighting requirements?
- What are HVAC requirements?
- How many people are we looking to work in this space?
- Listing of Equipment
- Hard drop(s) for ethernet connections
- Materials

- From Needs listing, we do a 'space program', listing space/area and the requirements of each
- From Space Program, we do three preliminary layouts / designs
- From Preliminary, we select one to refine.
- From Preliminary, we will price things out and create a draft timeline
- From Final Design, we will include layout, costs & timeline.
- Then to Facility Committee and Board of Directors for $$$$

Big Picture Planning

- Overall discussion of what the Elab wants to be:
    - Flexible in configuration to accommodate different sized things
    - Spread out broken stuff to DIY fix
    - Collaboration space - something to be able to work face to face
    - Space to demo stuff face to face
    - Space to work on micro-controllers
    - Space to work on project boxes; assembly for small projects
    - Three Main Sections: Fabrication & Assembly, Testing and finally Demonstration
    - Support for group activities (for example KidWind) and/or classes - robot teams, rocket teams, home automation teams
    - Support for proto-typing entrepreneurs
    - Will be important to know what we have and where it is located.
    - Support for education: IE. a Classroom kit - multi soldering kits and accessories - Will likely need three to six stations for Classroom function