

Dedicated tool platforms with a flat layout eases advanced tool prototyping, especially for laser/optical systems. However, taken together, the resulting dimensions are excessive, incompatible with smaller CNC machines.

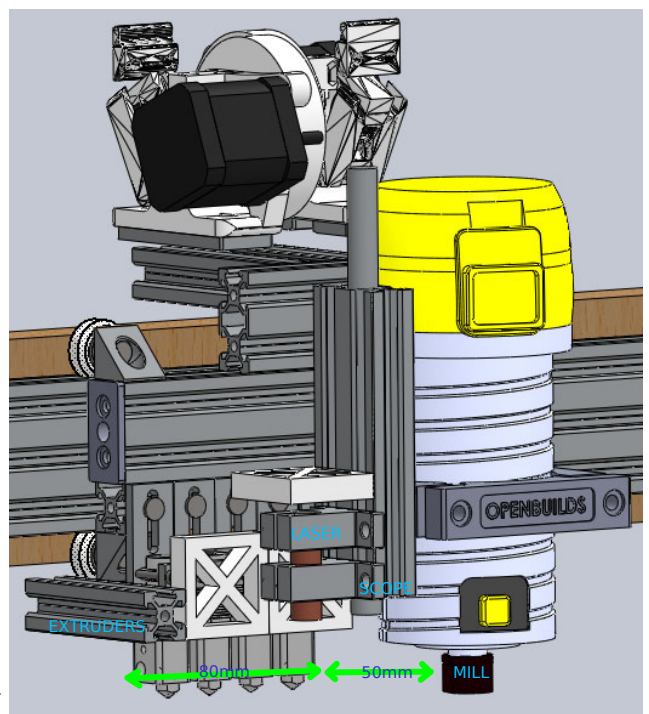
Distances between tools are vast, 275mm on the X-axis alone. Accessory hardware at the edges consumes even more space, and prevents tools from being 'stowed' outside the frame. Combined with toolpath generation software configuration limitations, usable build area is small as 250mm*75mm, out of a 610mm*610mm table. Even within this region, self-priming, self-cleaning, and tool parking features cannot be used safely.

Total weight measured >9lbs, estimated at 11lbs. Load center-of-gravity estimated at >100mm in front of the linear rail, applying strong leverage. Extra wear and positioning errors are incurred.

Extruders are not inline, and far from the linear rail. Microscopic positioning errors are greatly magnified, increasing the risk of damaging nozzle crashes.

Extruder vertical alignment requires measurement, dismounting and shimming.

Sophisticated airflow ducts proved difficult to install, and highly demanding of fan pressure.



All tools are within 130mm X-travel distance, >40mm stowable beyond frame.

Total weight calculated at <7.5lbs, adjustable center-of-gravity calculated at <20mm.

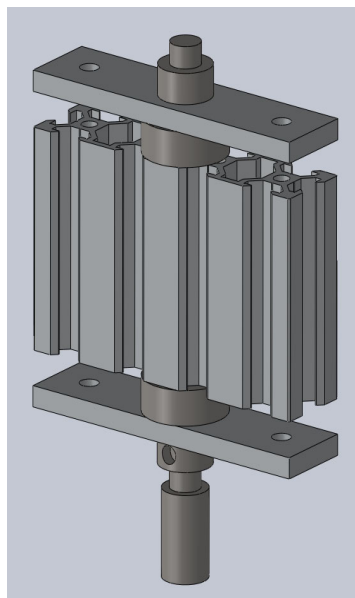
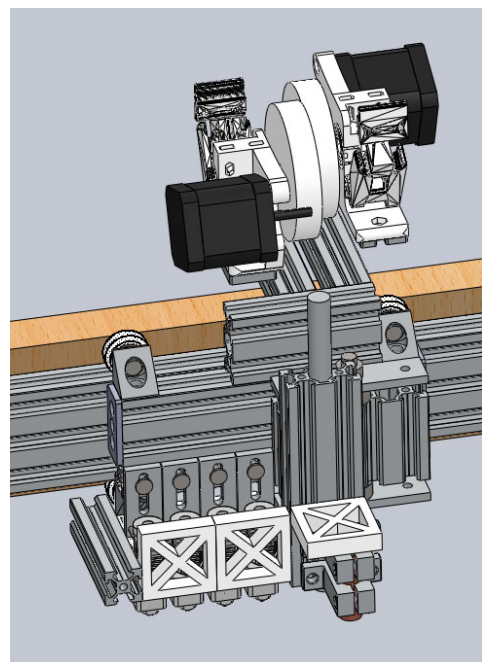
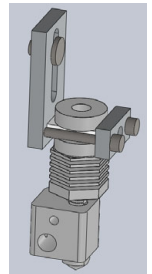
Extruders are inline and close to the linear rail. Tight-tolerance nozzle height alignment is resistant to disruption.

Extruder vertical alignment freely adjustable in place. All nozzles can drop to exactly the right height.

Airflow directly provided by standard 40mm computer case fans.

Dedicated platforms and standard flat plates have given way to simpler brackets making better use of vertical space.

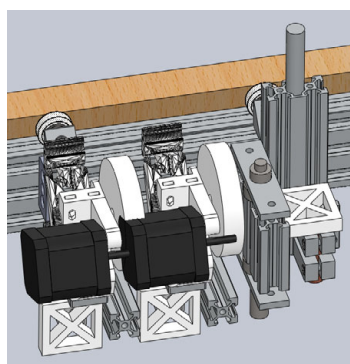
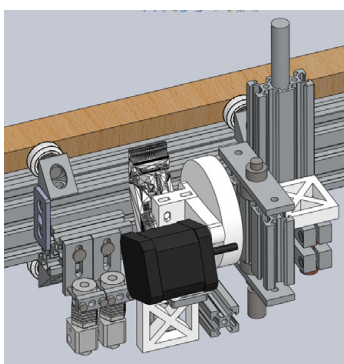
Here, standard groovemount plates have been replaced with a side-mounting clamp.



Built on modular brackets to aluminum extrusions, rather than rigorous plates, many rearrangements are possible without modifying underlying hardware.

Here, tool stowability has been maximized (fewer obstructions toward the front), and the commercial DeWalt router has been replaced by custom tooling.

Milling spindles are simple in principle, requiring only a shaft and precision bearings. Here, the assembly has been embedded into an aluminum extrusion, instead of the typical bulky steel tube. Compatibility with modern high-performance brushless motors is an added benefit.



More direct layouts with fewer extruders have been modeled. Similar approaches are expected to be used with machines lacking the TazMega's rigidity and modern electronic control systems.