



Inventors

Stephen Warren

Student/Grad MAE

*School for Engineering of
Matter, Transport & Energy*

Cameron Weston

Undergraduate Alumni

*School for Engineering of
Matter, Transport & Energy*

Jeremy Johnson

Student/Grad MAE

*School for Engineering of
Matter, Transport & Energy*

Abbas Jaber

Student/Grad MAE

*School for Engineering of
Matter, Transport & Energy*

Brandon Lamoureux

Undergraduate Alumni

*School for Engineering of
Matter, Transport & Energy*

Intellectual Property

Status:

Pending

Contact

Bill Loux

Director of Business
Development, Physical
Sciences

Arizona Technology
Enterprises, LLC (AzTE)

P: 480.884.1992

F: 480.884.1984

BLoux@AzTE.COM

TECHNOLOGYVENTURES@AZTE.COM

Vacuum-Mounted Portable Computer Numerical Control (CNC) Machine

AzTE Case #M14-151P

Background

CNC machines use computers to control indexable tools for shaping intricate 3-dimensional designs that are otherwise impossible by manual machining. Their precision and automation allow them to repeatedly reproduce complex shapes with complete accuracy and little effort. Typically, industrial CNC machines are bulky, complicated, expensive, and anchored to a desktop or workstation, making them unsuitable for smaller-scale machining on large objects or frequent relocation and reorientation. Existing portable CNC machines are either mounted on lightweight rails or are handheld, increasing the risks of machine imprecision and operator error. Therefore, there is a need for a portable, rugged, orientable CNC machine that offers industrial quality sturdiness and accuracy.

Invention Description

Researchers at ASU have developed a vacuum-mounted, portable, 3-axis CNC machine that can operate on walls, ceilings, or other unconventional orientations with the precision of an industrial tabletop machine. This machine can attach to a variety of different surface types including concrete, plywood, and non-ferrous metals. Affixed underneath the rectangular chassis, the vacuum mount has four independent chambers that can be separately turned on or off for adapting to uneven surfaces and configurations where not all chambers would provide a seal. Metalworking clamps are no longer needed but are still an option. Lightweight, inexpensive, highly operational, and easy to use, this machine is the perfect combination of accessibility and functionality for all your job-site CNC machining needs.

Potential Applications

- Hobbyist CNC Machining
- Portable Precision CNC Milling, Grinding, & Routing

Benefits and Advantages

- **Dependable** – Simple, compact, yet effective design.
- **Economical** – Costs very little time and material to manufacture and assemble.
- **Innovative** – Can fasten to a variety of both even and uneven surfaces and in unconventional orientations without the use of clamps.
- **Practical** – Multi-purpose, multi-function, mobile machine.
- **Rugged** – Fits in the back of a pickup truck and can be taken anywhere.