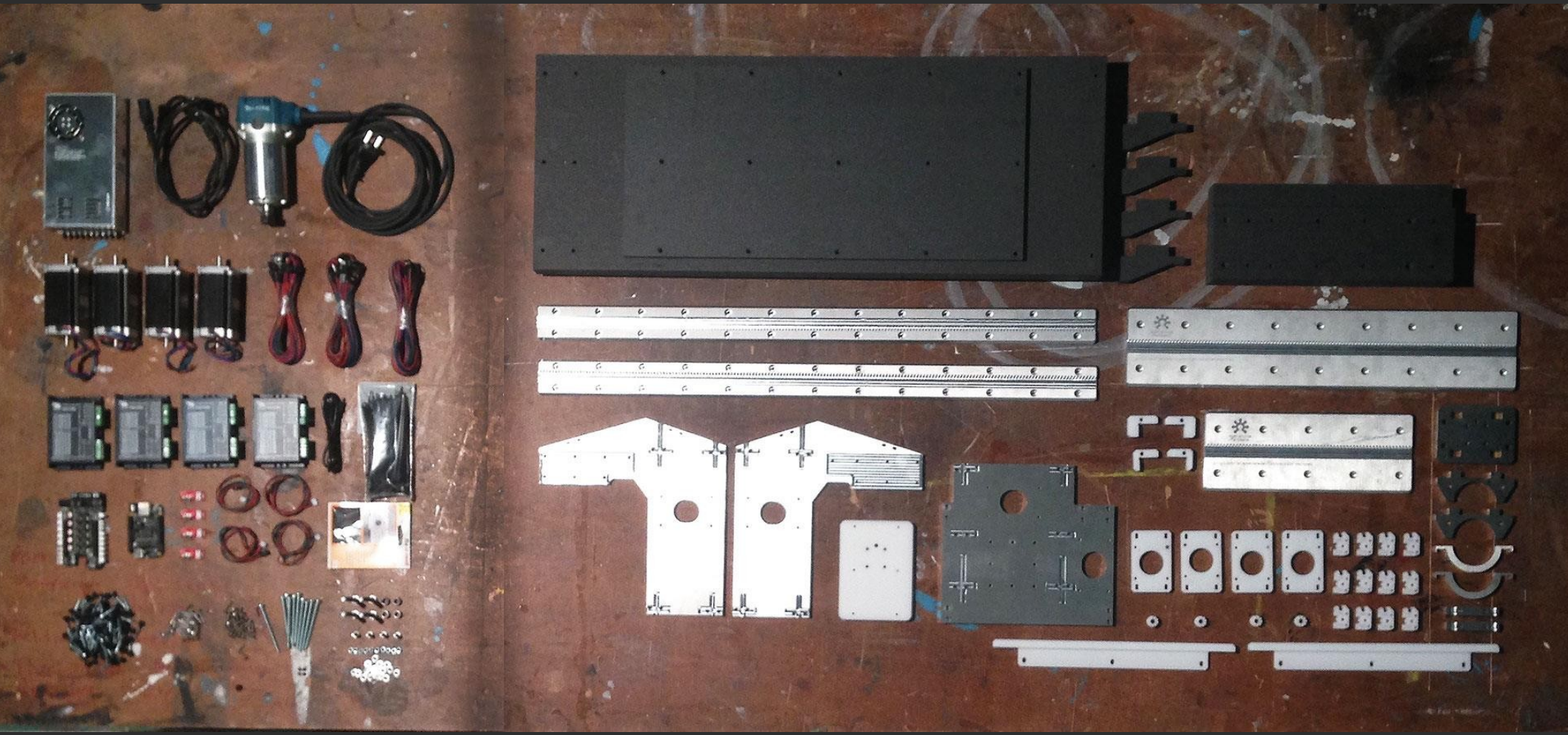

fabricatable
machines

Fabricatable machines

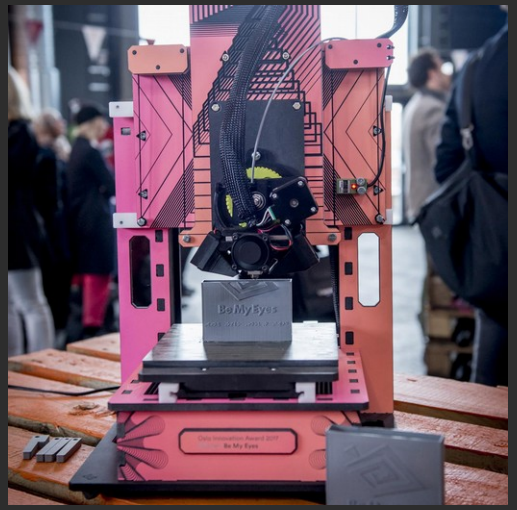
- Open informal research project – anyone can use and contribute
- Lives on github.com/Fabricatable-Machines

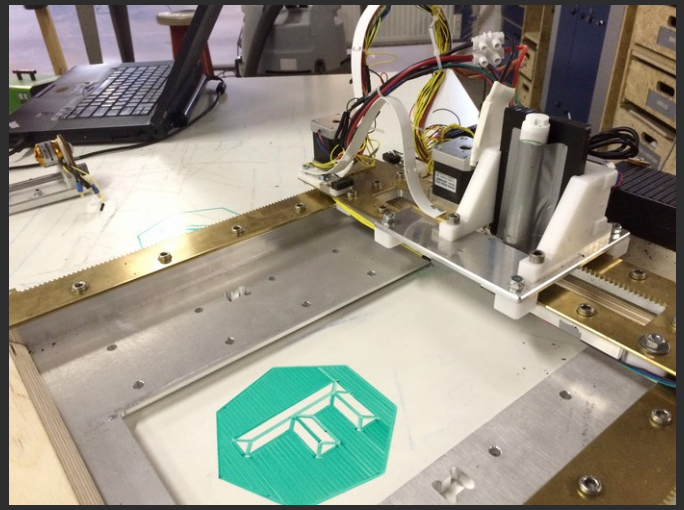
Goals

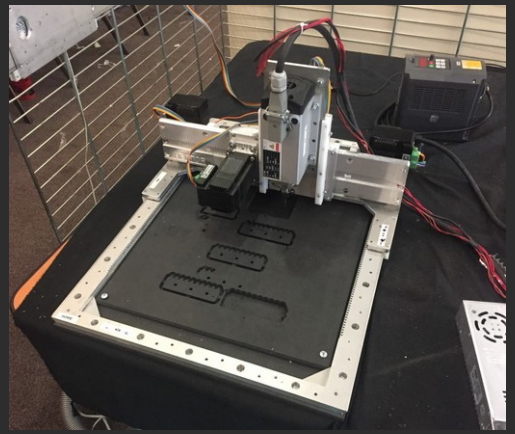
- Enable people to make and play around with custom digital fabrication machines
- Focus on making as many parts of a machine as possible



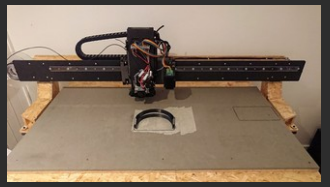
Favourite machines so far

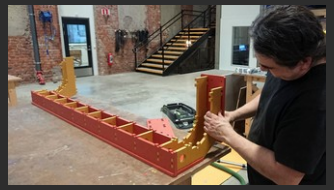






Humphrey1 versions





Whats is "Fabricatable"?

- Accesable techniques
- Simple and accesable BOM
- Focus on DIY over sourcing parts
- Complexity in CAD, simplicity in manufacturing and assembling
- Open source (files and toolchain)

Fabricatable business

- Gentleman agreements with royalties
- Direct sales
- https://www.patreon.com/jensdyvik

Lessons learned

- DIY rails is mostly suitable for small light duty machines
- Segmented rails are tricky
- "CNC friendly rack and pinion" works well
- Gearing is still needed for stiff machines
- HPL sheets work well
- Electronics and wiring is a hurdle
- Alu extrusions + FDM is more accesible than large format machining

Demo TEI '20, February 9–12, 2020, Sydney, NSW, Australia

Fabricatable Machines: A Toolkit for Building Digital Fabrication Machines

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Figure 1: This is Fabricatable Machines. A toolkit that lets users design, fabricate and build custom digital fabrication machines. We implemented a linear actuator, The Fabricatable Axis, that is both parametrically sized and optimized to be manufactured using a CNC milling machine. Users can prototype and explore combinations of linear motion virtually using the parametric CAD model, before fabricating and assembling their design.

ABSTRACT

Digital fabrication is changing the way we design and manufacture the objects around us. Digital fabrication machines enable mass-customisation. However, customising the machines themselves requires a high amount of expertise, which prevents even advanced users from taking part in the creation of bespoke fabrication tools. We present Fabricatable Machines, an open-source toolkit for designing custom fabrication machines. We designed a linear motion module, The Fabricatable Axis, that provides robust automated linear motion. The Fabricatable Axis can be resized, adjusted, and fabricated from different materials. Users can build machines by combining multiple axes. We optimised the design of the axis to be manufactured using a CNC mill, with few externally sourced parts. We observed users creating machines including portable milling machines, 3D printers, and pipe inspection robots using the Fabricatable Machines Toolkit.

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Frikk H Fossdal, Jens Dyvik, Jakob Anders Nilsson, Jon Nordby, Torbjørn Nordvik Helgesen, Rogardt Heldal, and Nadya Peek. 2020.

CCS CONCEPTS

• **Human-centered computing** → **Interactive systems and tools.** • **Applied computing** → **Computer-aided manufacturing.**

KEYWORDS

Digital Fabrication, Machine Building, CNC, CAD/CAM

from scratch requires expertise within several different engineering domains and a broad supply chain of parts. Can

Research paper

- https://github.com/fellesverkstedet/fabricatable-machines/raw/master/publications/Fabricatable%20Machines%20-%20A%20Toolkit%20for%20Building%20DigitalFabrication%20Machines%20-%20TEI202.pdf

Modules-Axes-Machines

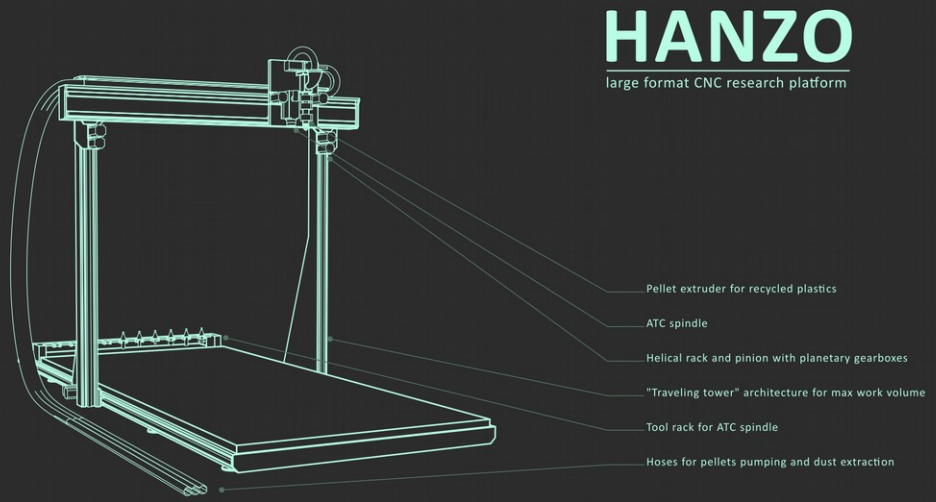
- https://github.com/fellesverkstedet/fabricatable-machines/wiki/Modules

Humphrey2

- https://github.com/Fabricatable-Machines/Humphrey2

Hanzo

- https://github.com/Fabricatable-Machines/Hanzo



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