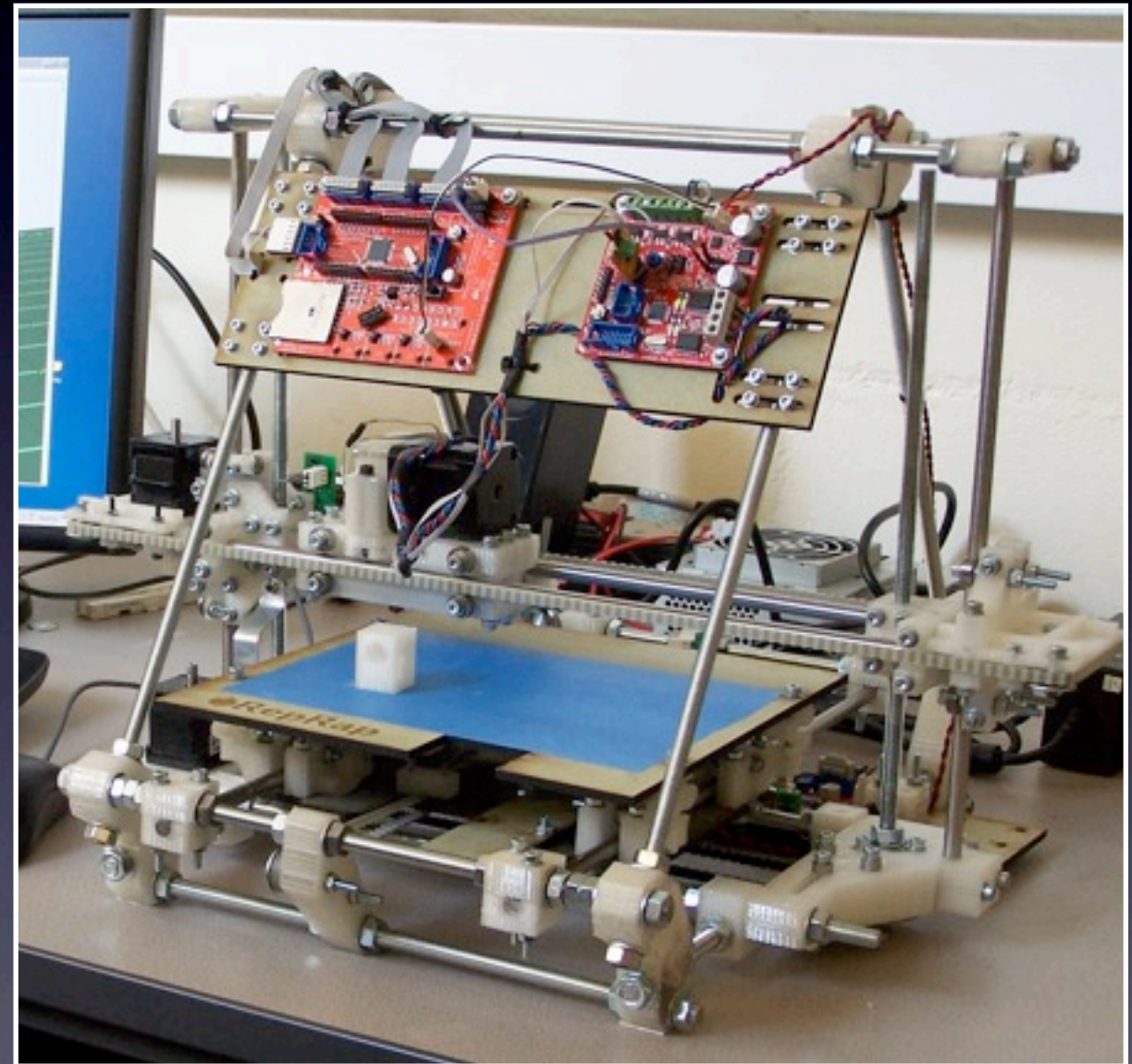# ●RepRap

Open Source self-replicating 3D printer
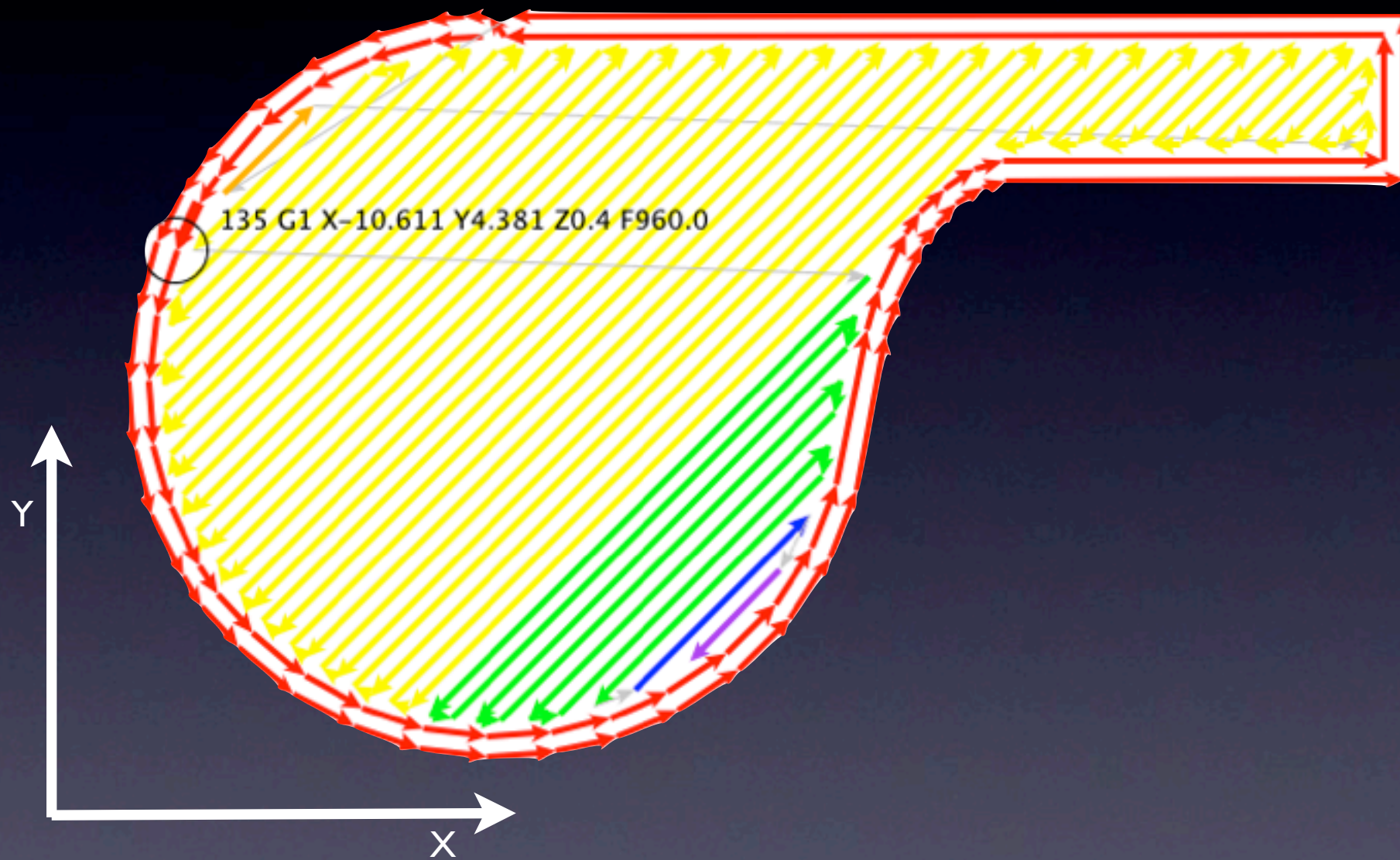

Josef Průša
josefprusa.cz
@prusajr

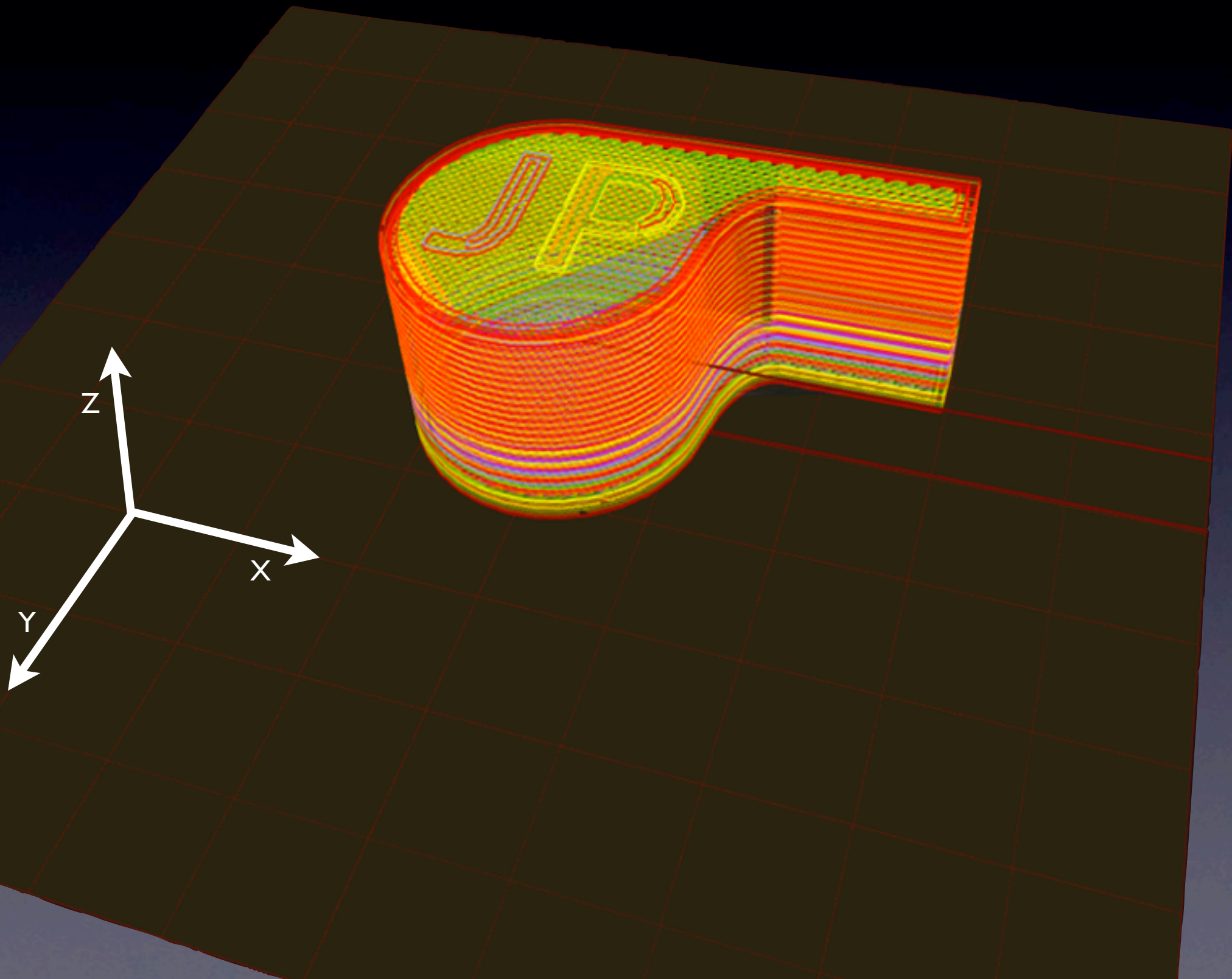# What is 3D printer?

- Additive processes vs. substrative processes

- 3D printing adds material instead of milling it away

How does 3D printer work?

135 G1 X-10.611 Y4.381 Z0.4 F960.0

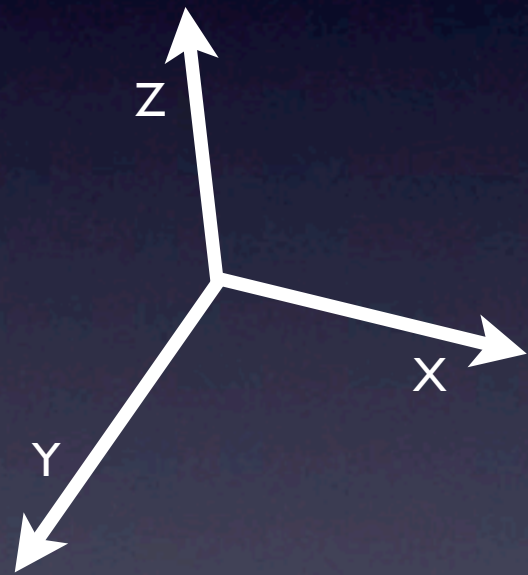2D + 2D + 2D + 2D + 2D = ?????

How does 3D printer work?

Simplified principle

Cartesian robot   +   Extruder

+

= 3D printer
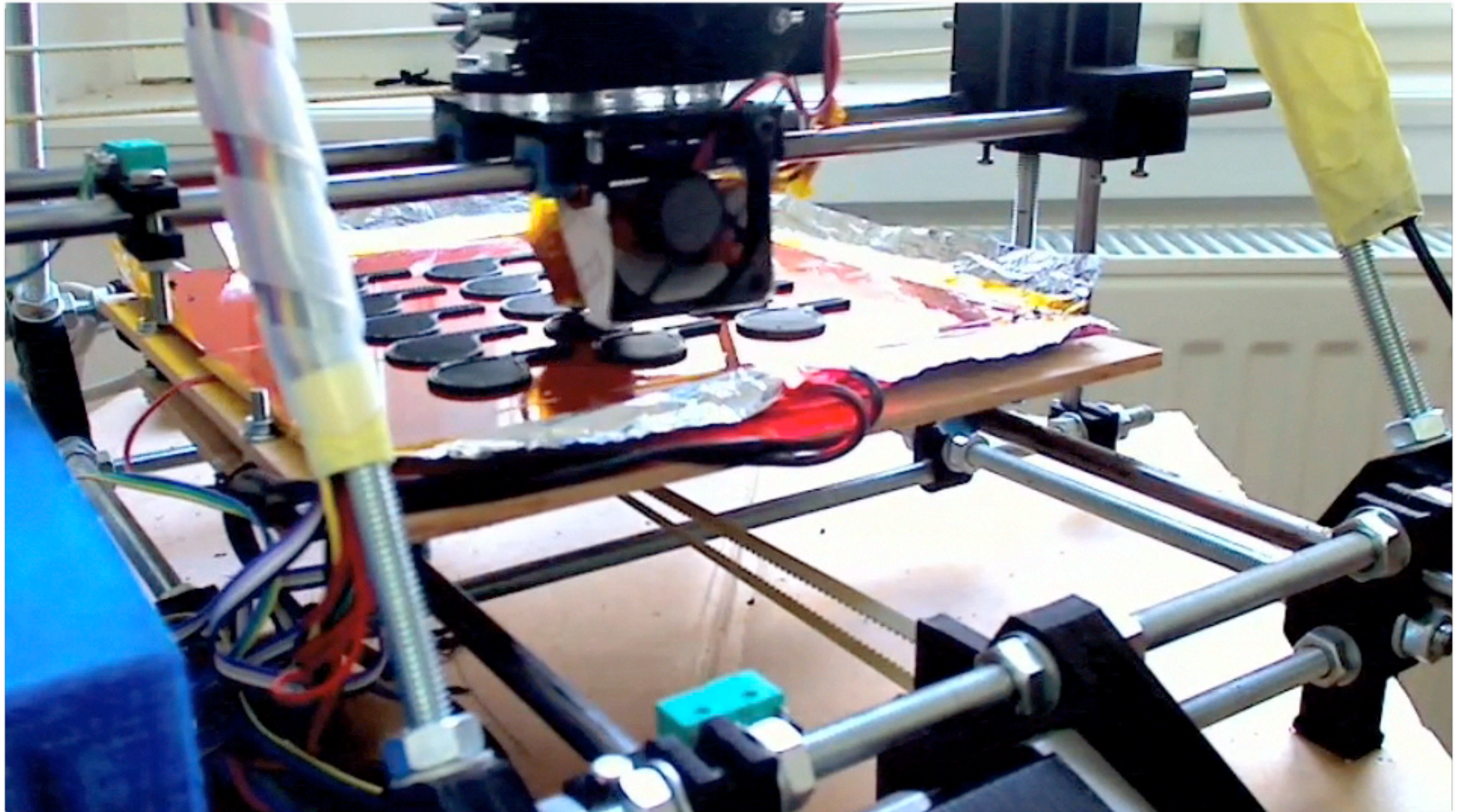
Extrusion detail

video by Koen Kooi

Extrusion detail

video by Koen Kooi

240 whistles for TEDxPrague 300 more to go

Printing of whistles

"History"

- 2005 - Founded by Dr Adrian Bowyer at the University of Bath

- 2006 - First part printed

- 2008 - RepRap Darwin

- 2009 - RepRap Mendel

- 2010 - Huxley, Prusa Mendel
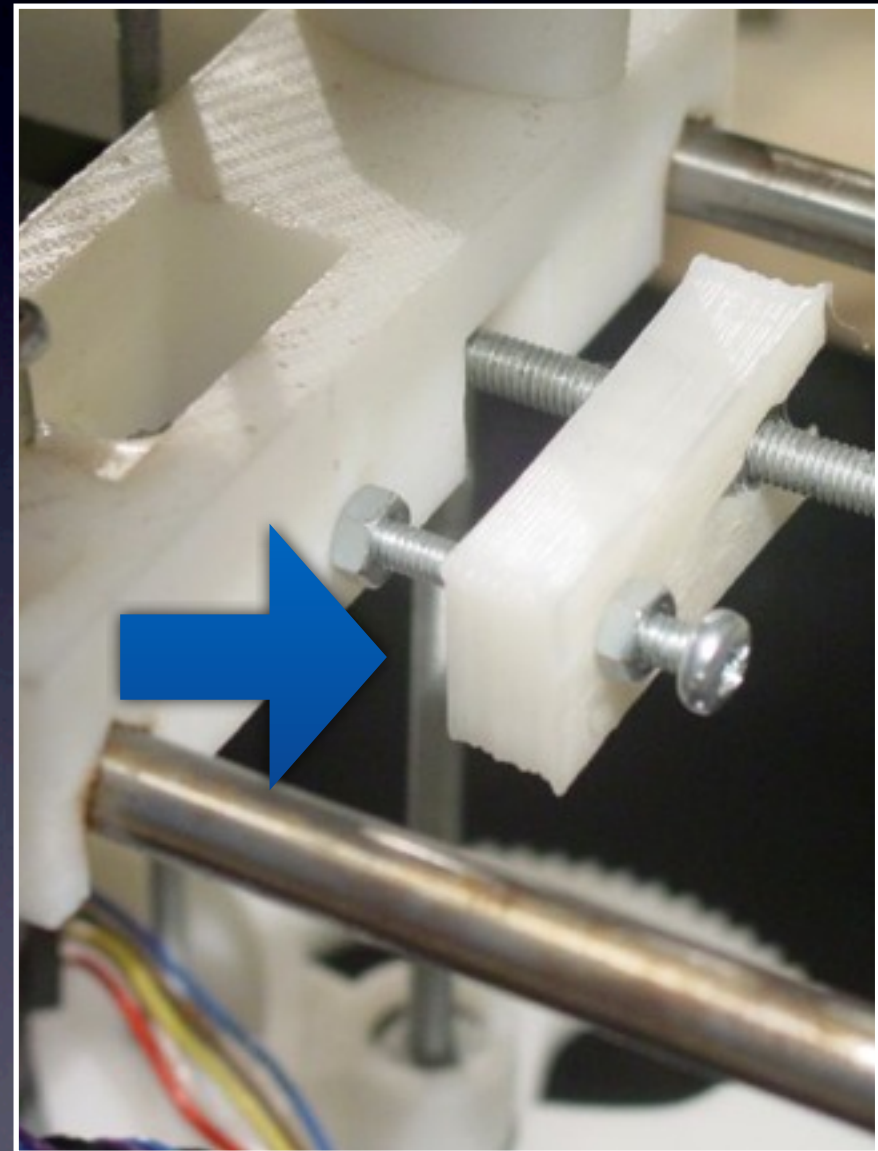
2006 first printed part

- Chicken and egg problem

photo by Vik Oliver

2008 Darwin

- First printer released

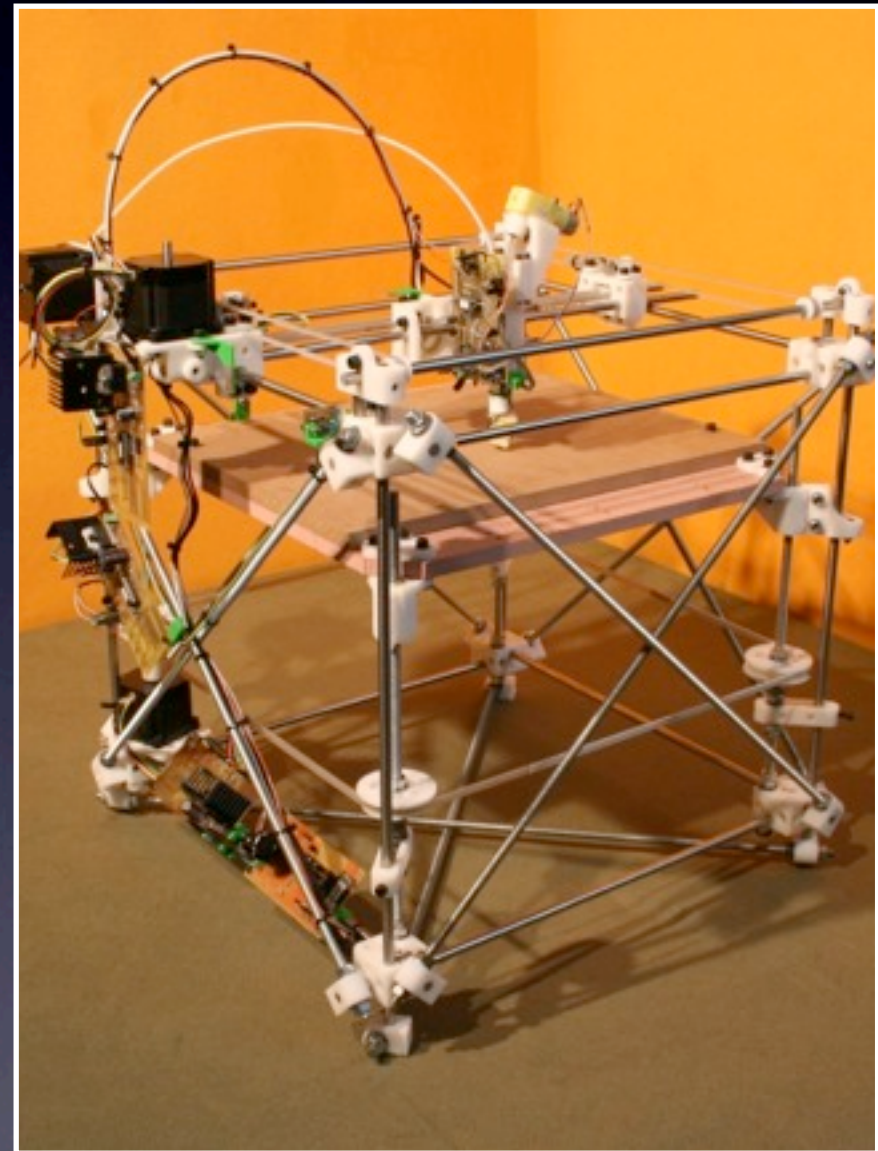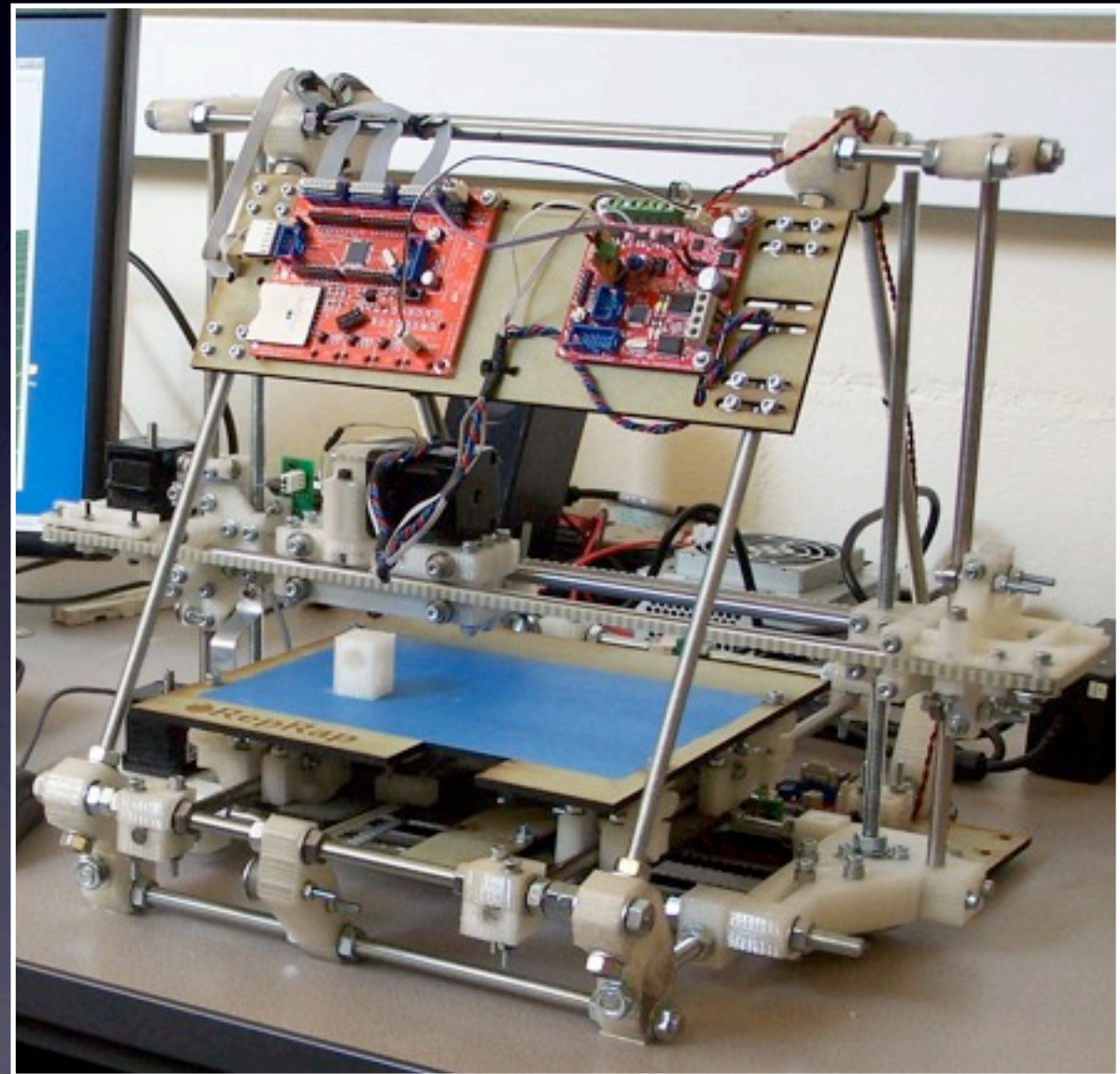- Big, bulky, hard to assemble

- But it worked!!

photo by Adrian Bowyer

2009 Mendel

- Smaller

- Faster

- Faster to replicate

2010 Huxley

- Even smaller

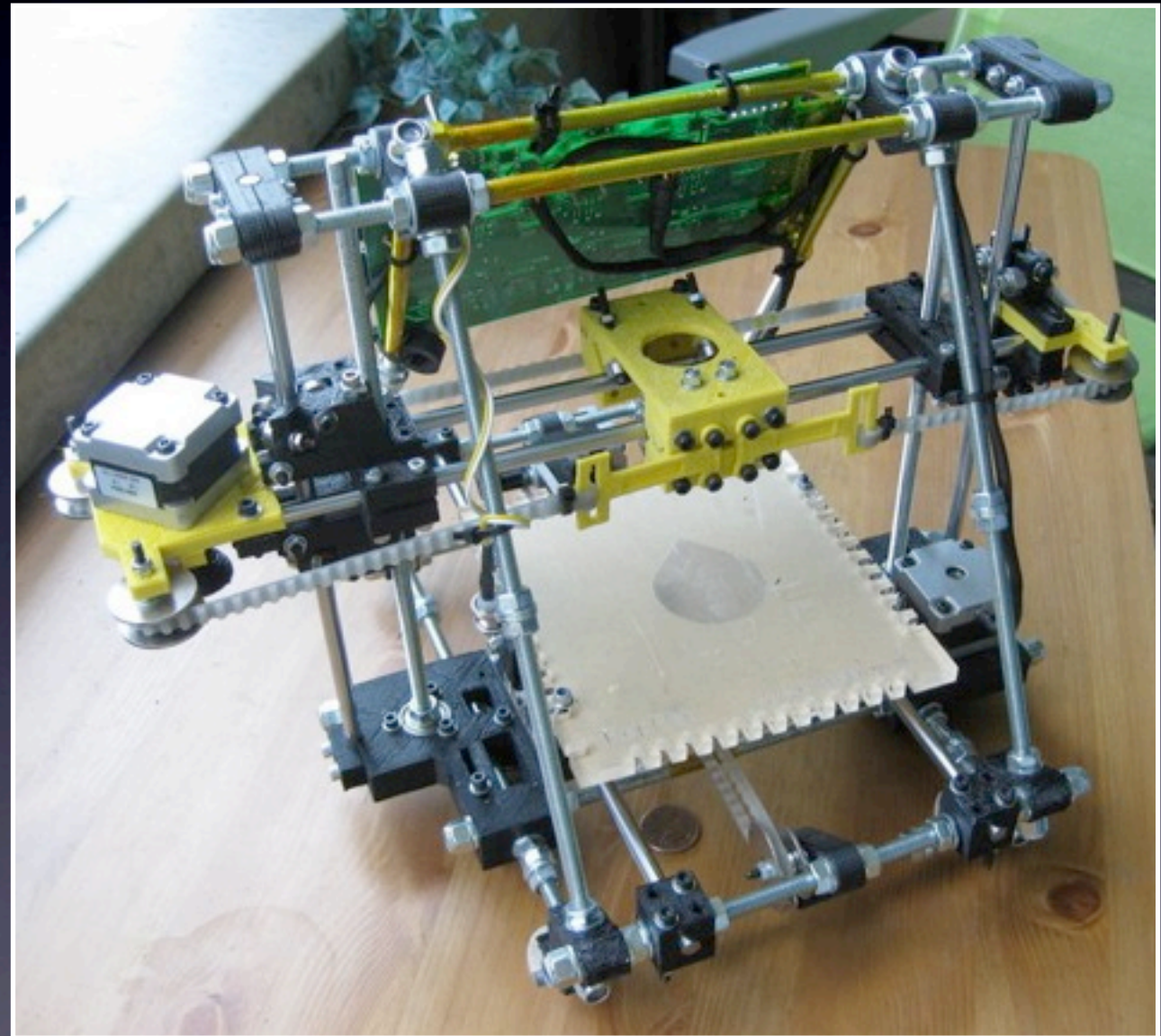- Still PITA to assemble
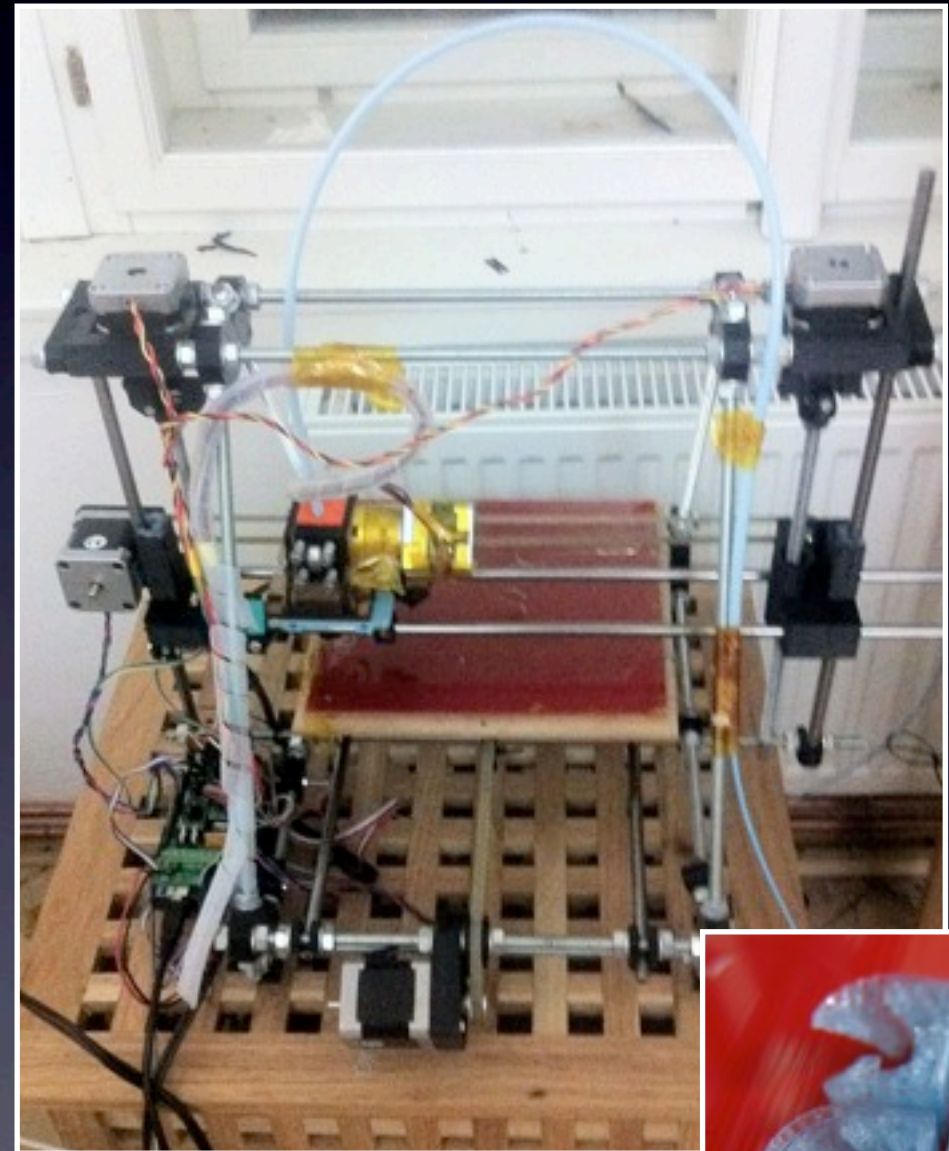
- Smaller build area

photo by Erik De Bruijn

2010 Prusa

- Almost no bearings, using PRINTED alternatives

- Build time reduced to few days for newbies

- Half replication time

Number of printers

- nobody really knows, most of the printers are crowd-sourced

- Erik de Bruijn estimated in his thesis between 3872 and 4840 people in the community (October 2010)

- But what we know for sure, community grows exponentially!!

Materials

- mostly thermoplastics in 3mm or 1.75mm rod form
  - ABS (LEGO)
  - PLA (compostable plastic, throw away cups)
- paste consistence materials
  - clay (ceramics)
  - silicone
  - chocolate
- exotic materials
  - metals
  - chemicals for electronics printing
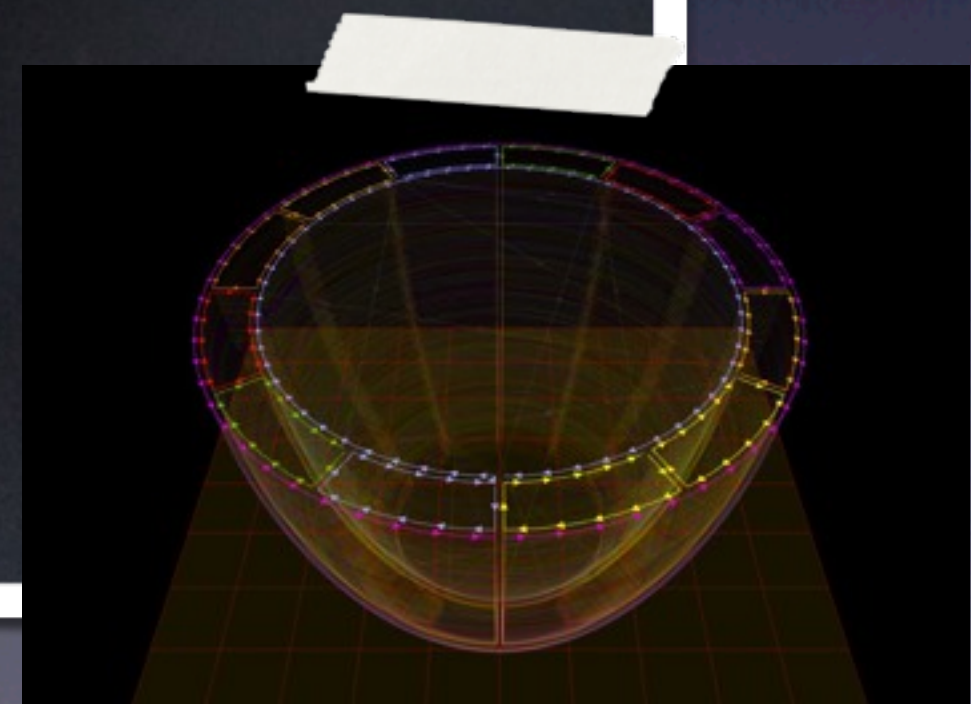
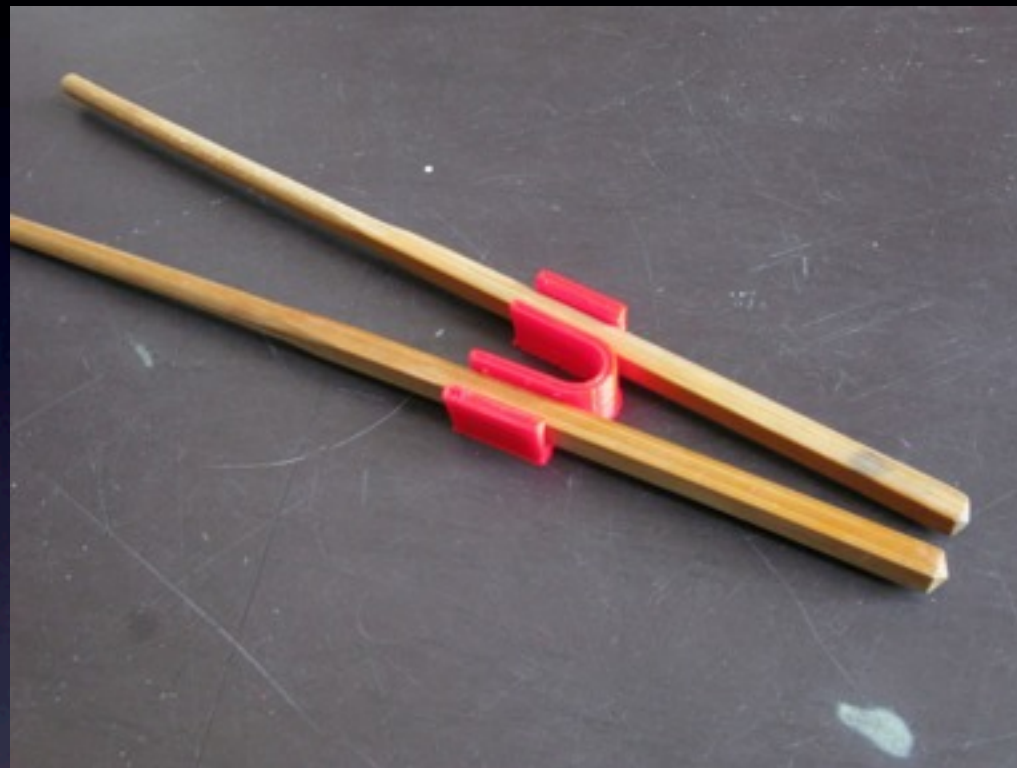# Impossible ceramics

photo by Unfold

Real life use

- Starts from small everyday use objects

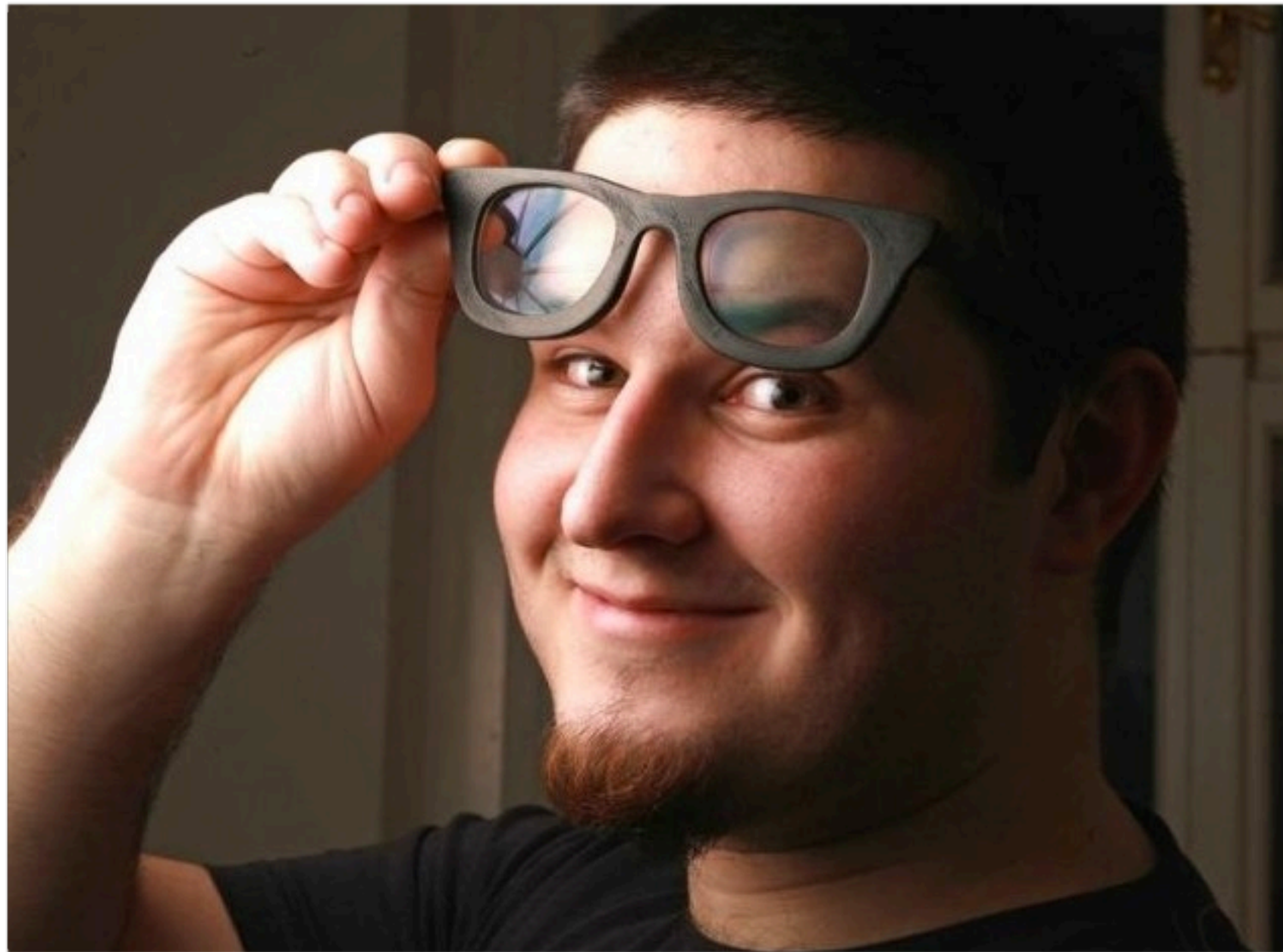by nophead

by zydac

by DesignGlut

by wade

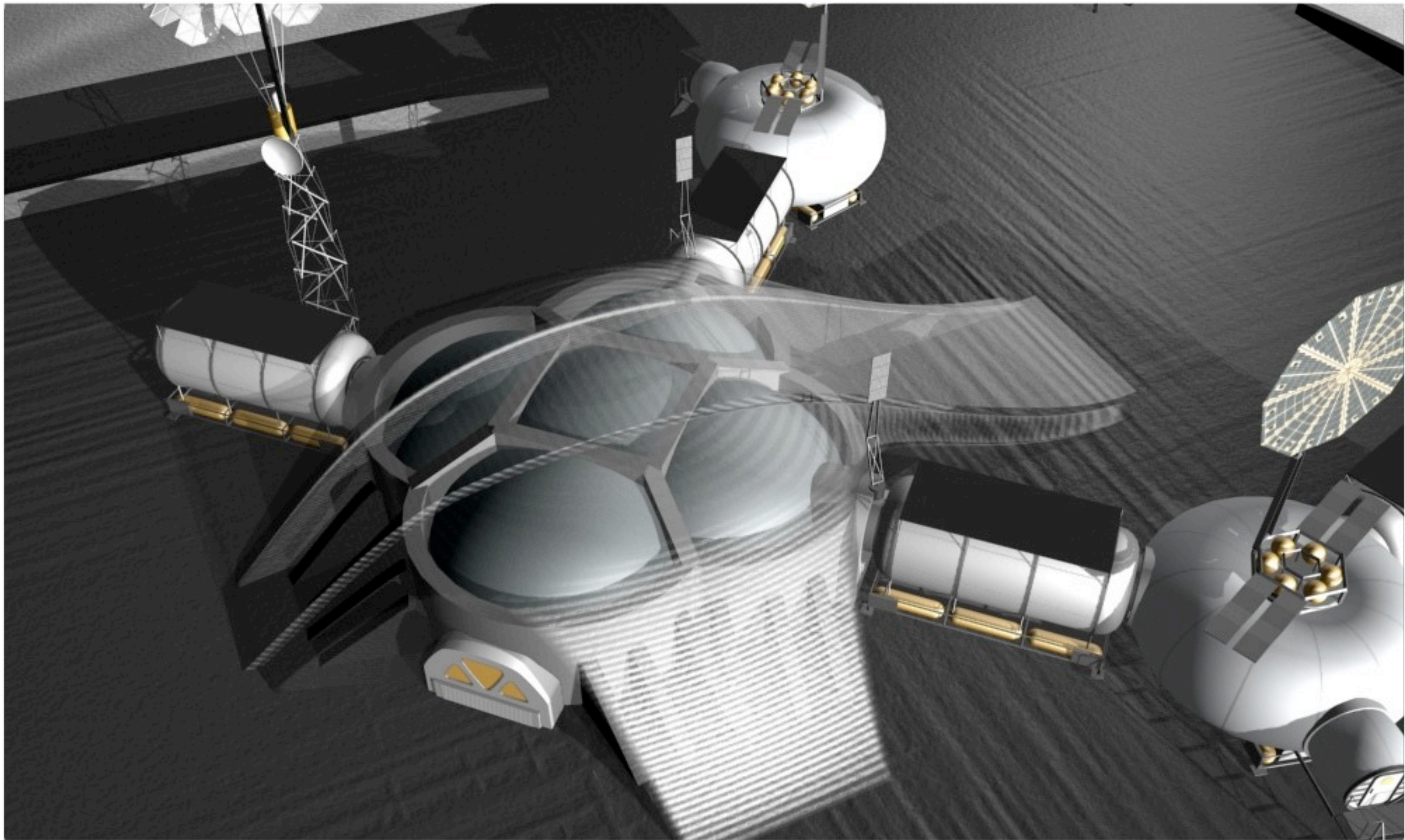photo by MakerGear

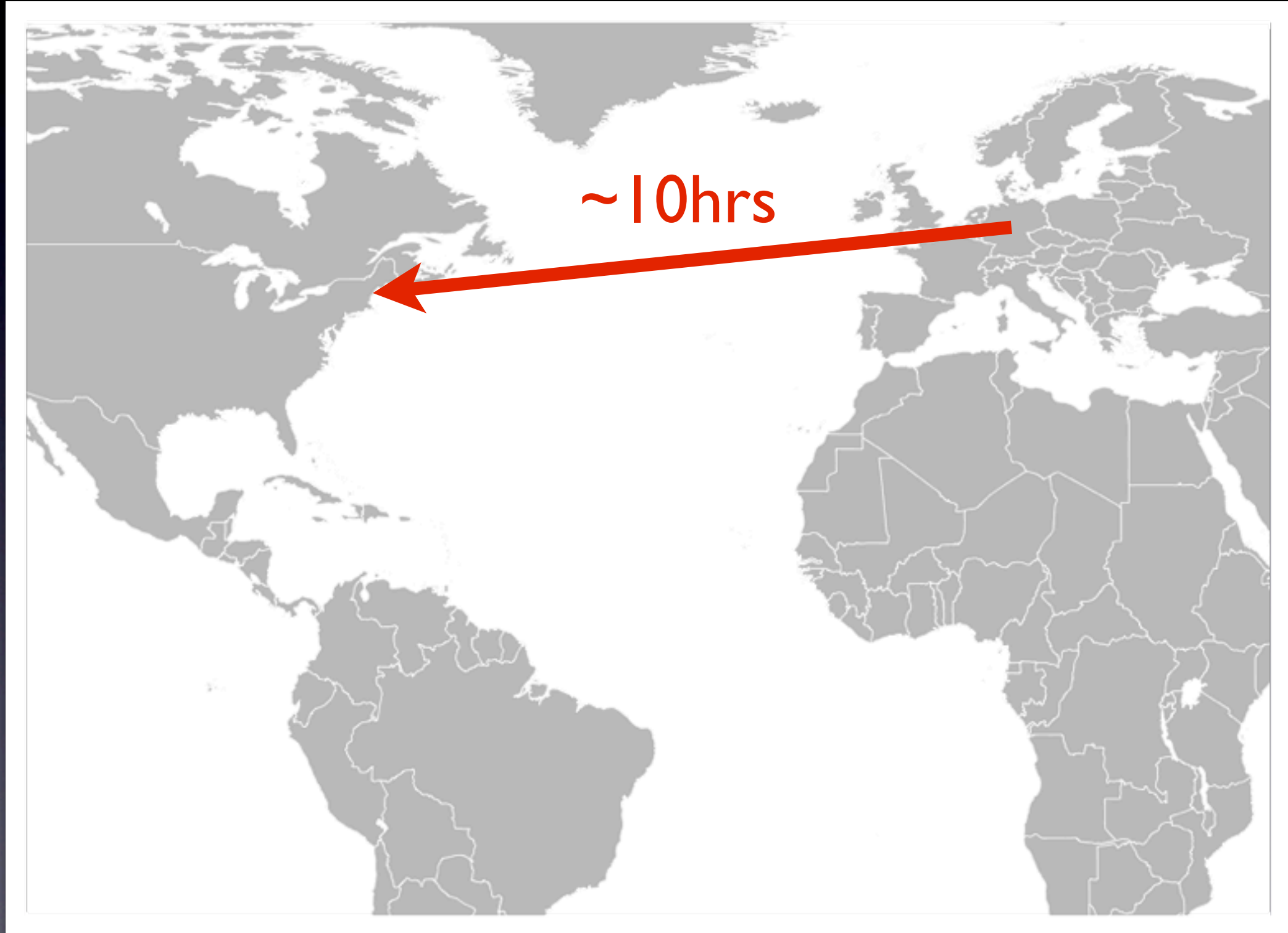First ever working open source glasses?!

GPL v2

photo by root.cz

image by NASA
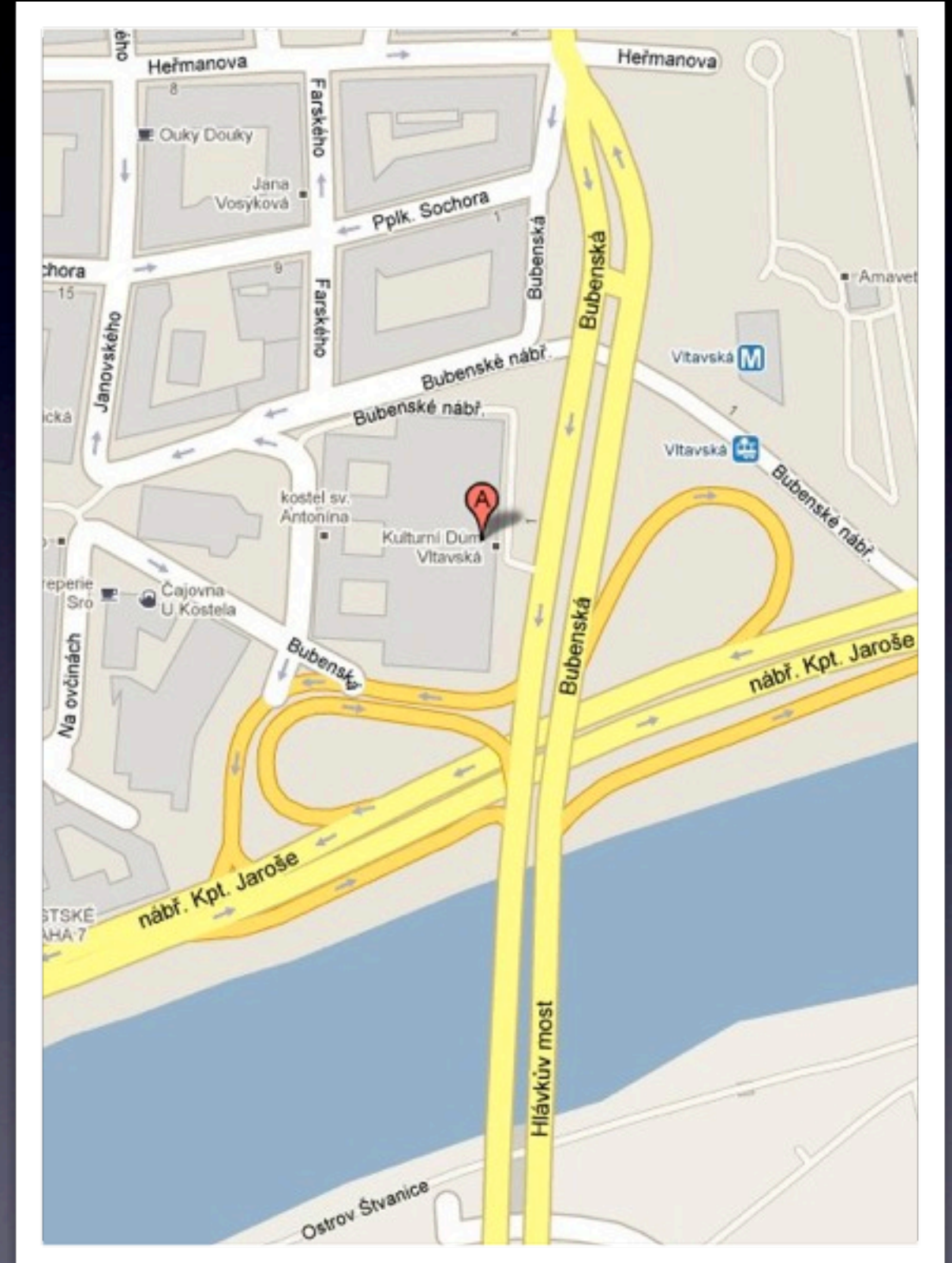
design and image by Tomáš Rousek

Whistle story

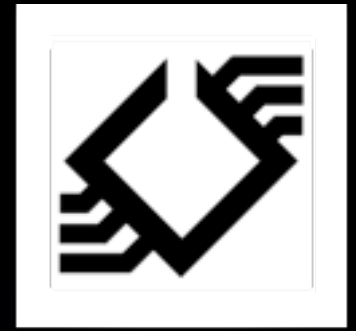- Whistle was originally designed by Zaggo, located in germany

~10hrs

3D printer in every home

- First in hackerspaces, which will work as 3D copy centers. Basically happens now.

- Nobody can guesstimate when 3D printer will be in every home

brmlab
hackerspace prague

http://brmlab.cz

Why Open Source

- You can't sell more then one self replicating machine. Its bad business model.

- Much faster development

- No worries with patents, more time for developments

- Free open source education

RepRap project structure

- 22 "admins"

- mostly administration

- everyone contributes, doesn't matter if he's admin or not

Build party Aachen

Build party Maastricht

Build parties

- People forget how awesome is it to create something with their own hands!!!

Question time

Why we call it printing?