shapesmith

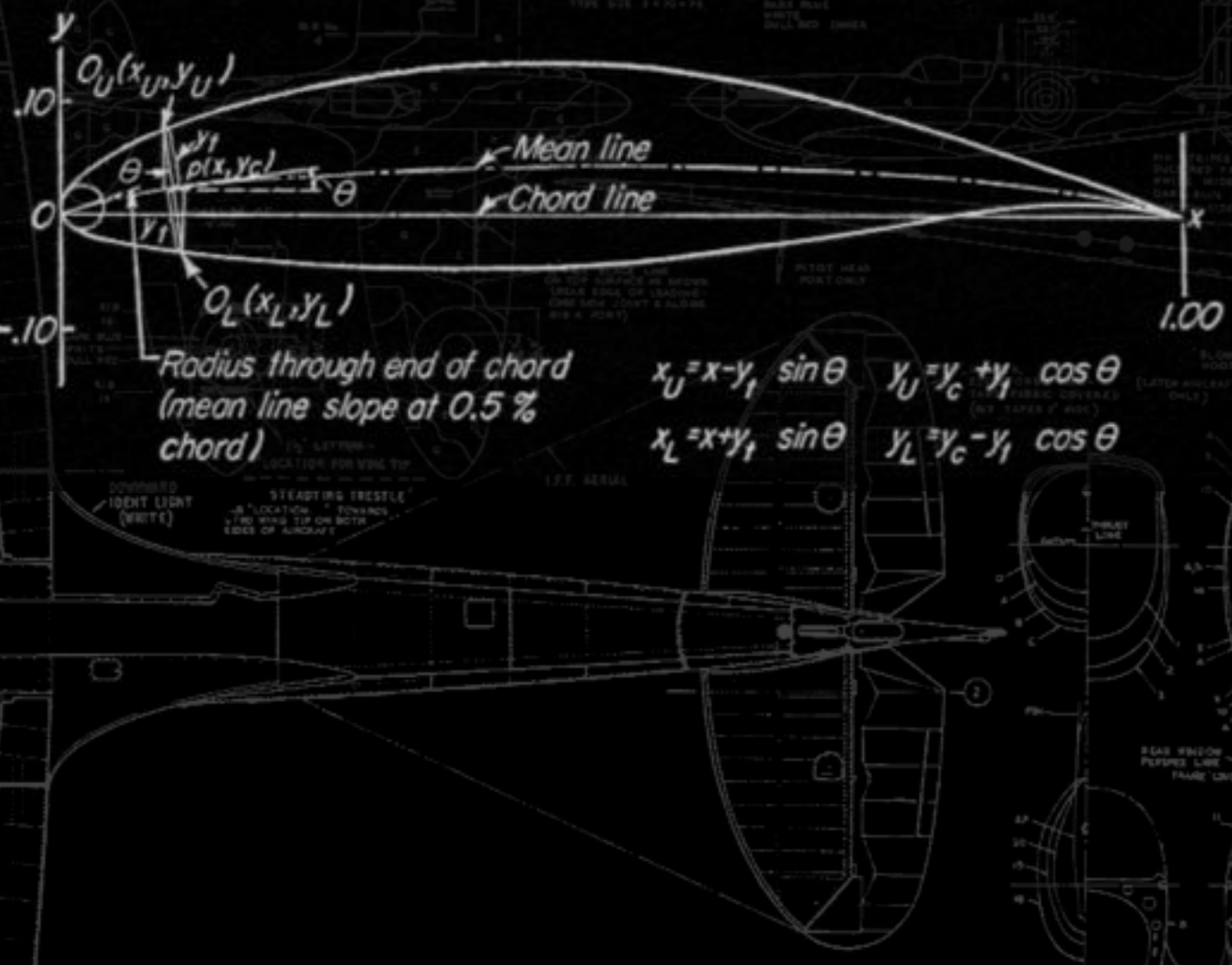
@shapesmith

Benjamin Nortier
@bjnortier

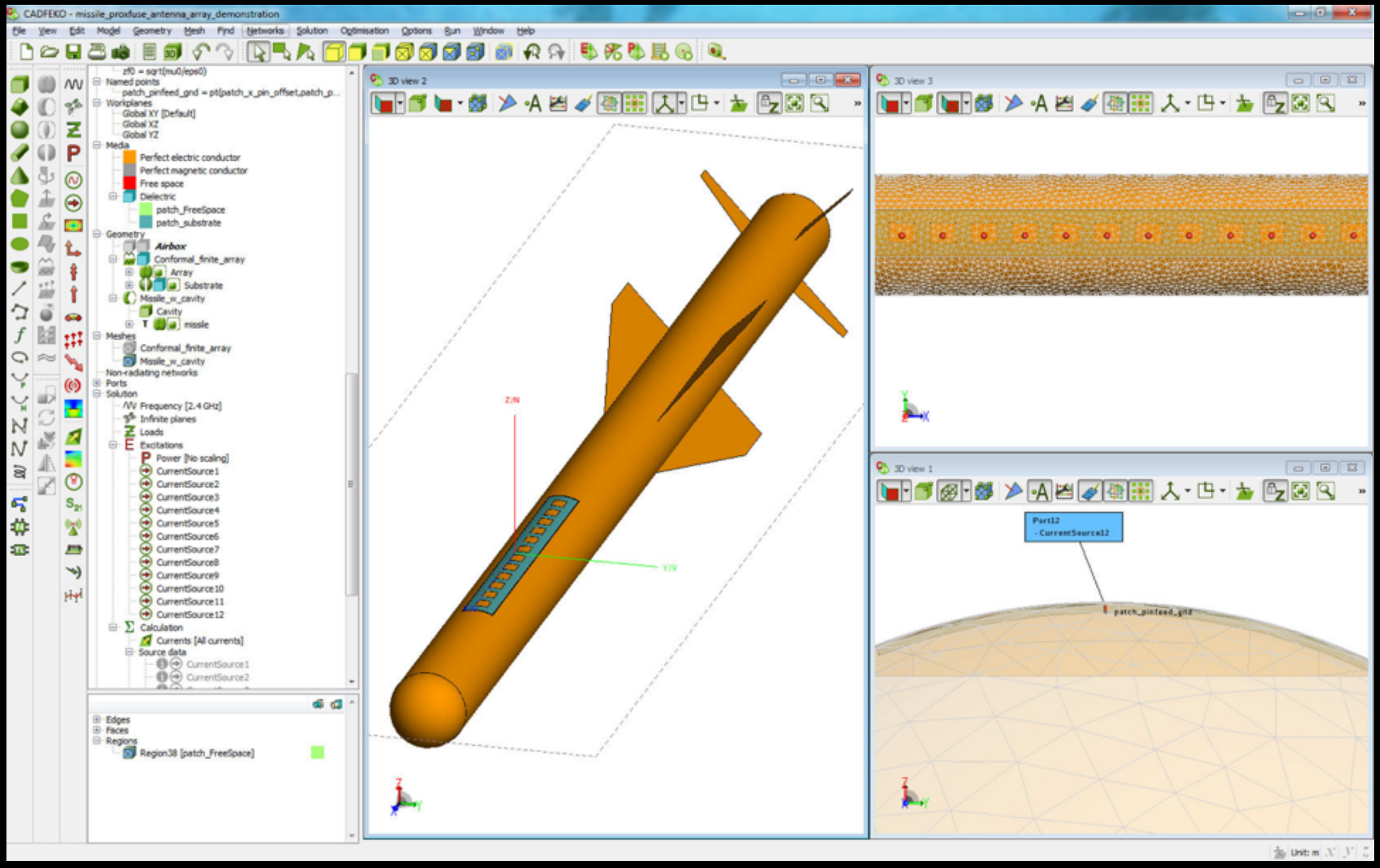
http://www.shapesmith.net
bjnortier@shapesmith.net
http://github.com/bjnortier/shapesmith

Why?

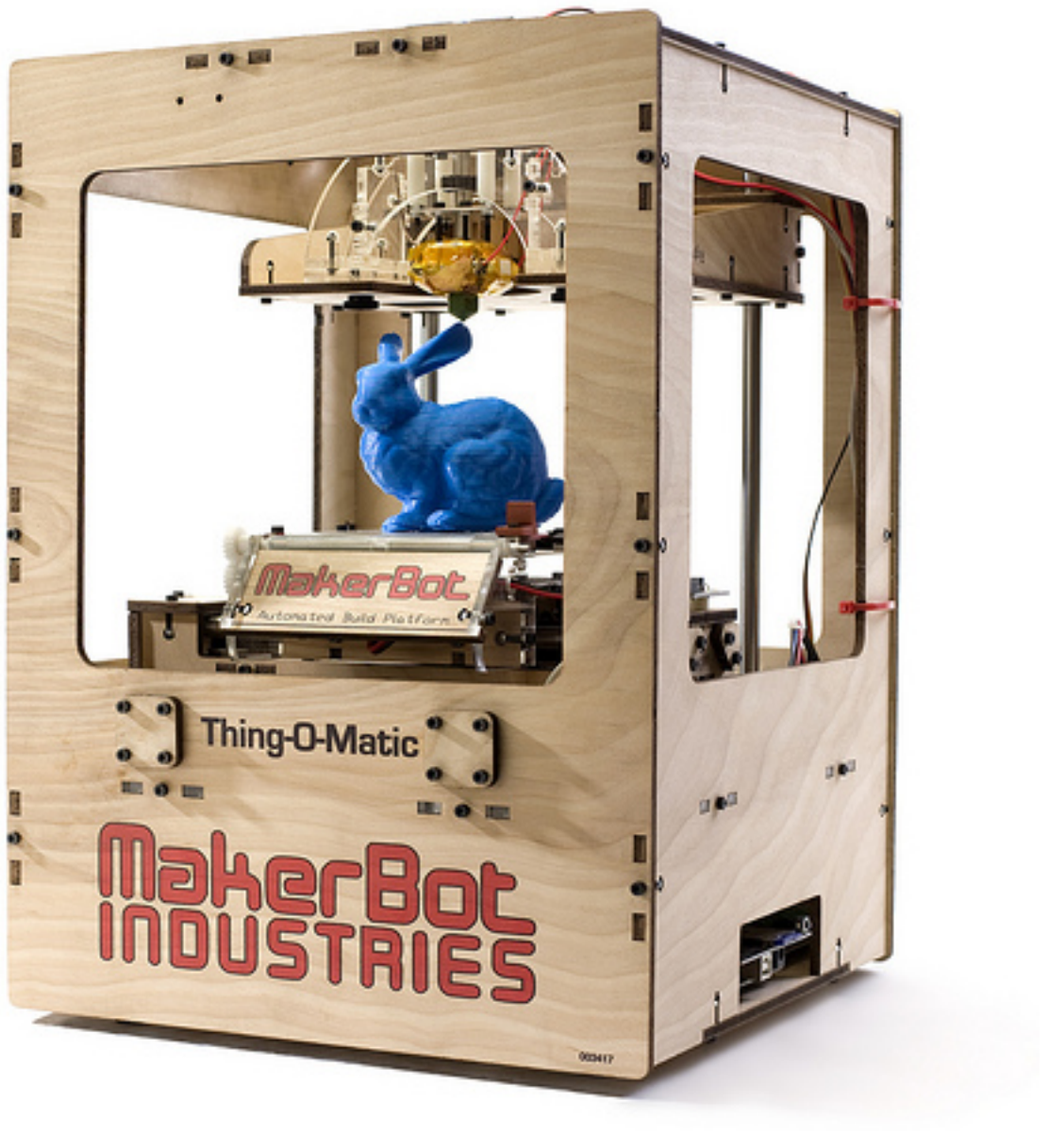
NACA Airfoil



CADFEKO

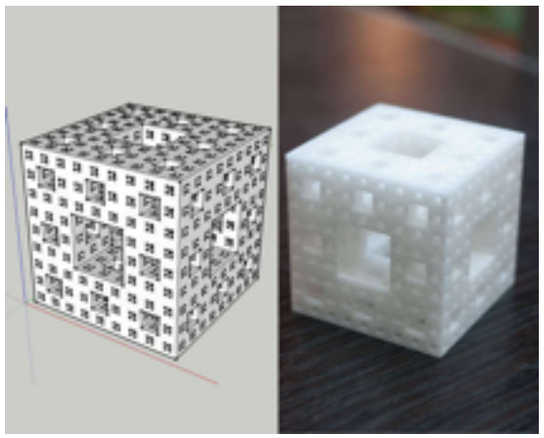

CADFEKO - missile_proxfuse_antenna_array_demonstration
File View Edit Model Geometry Mesh Find Networks Solution Optimisation Options Run Window Help
Named points
patch_pinfeed_gnd = pt(patch_x_pin_offset,patch_p...
Workplanes
Global XY [Default]
Global XZ
Global YZ
Media
Perfect electric conductor
Perfect magnetic conductor
Free space
Dielectric
patch_FreeSpace
patch_substrate
Geometry
Airbox
Conformal_finite_array
Array
Substrate
Missile_w_cavity
Cavity
missile
Meshes
Conformal_finite_array
Missile_w_cavity
Non-radiating networks
Ports
Solution
Frequency [2.4 GHz]
Infinite planes
Loads
Excitations
Power [No scaling]
CurrentSource1
CurrentSource2
CurrentSource3
CurrentSource4
CurrentSource5
CurrentSource6
CurrentSource7
CurrentSource8
CurrentSource9
CurrentSource10
CurrentSource11
CurrentSource12
Calculation
Currents [All currents]
Source data
CurrentSource1
CurrentSource2
Edges
Faces
Regions
Region38 [patch_FreeSpace]
3D view 2
3D view 3
3D view 1
Port12
- CurrentSource12
patch_pinfeed_gnd
Unit: m

Makerbot



$1300

shapeways



Ponoko®
the world's easiest making system

i.materialise

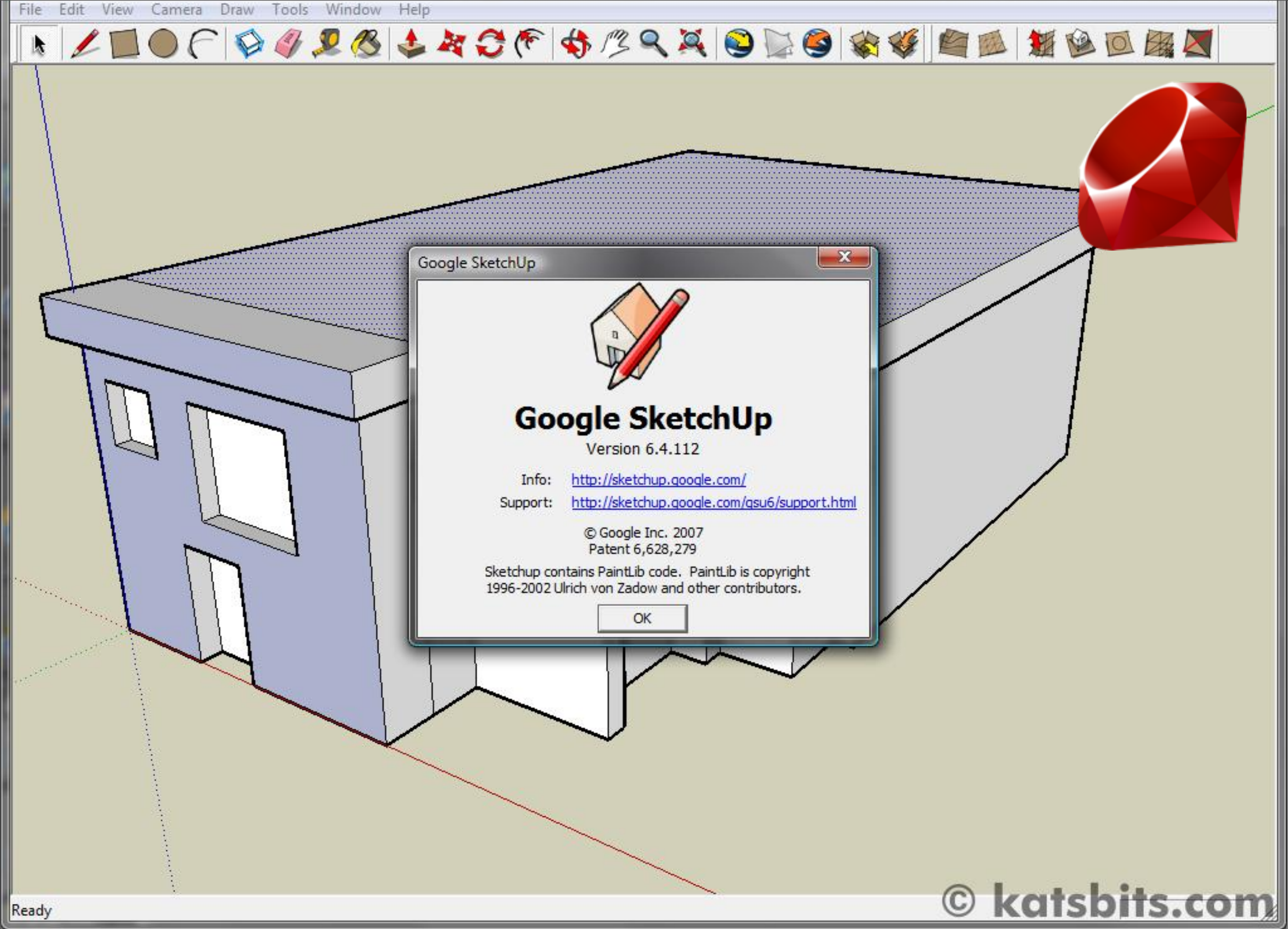
How do you build a [parametric] model?

The traditional approach:
Desktop 3D modelling

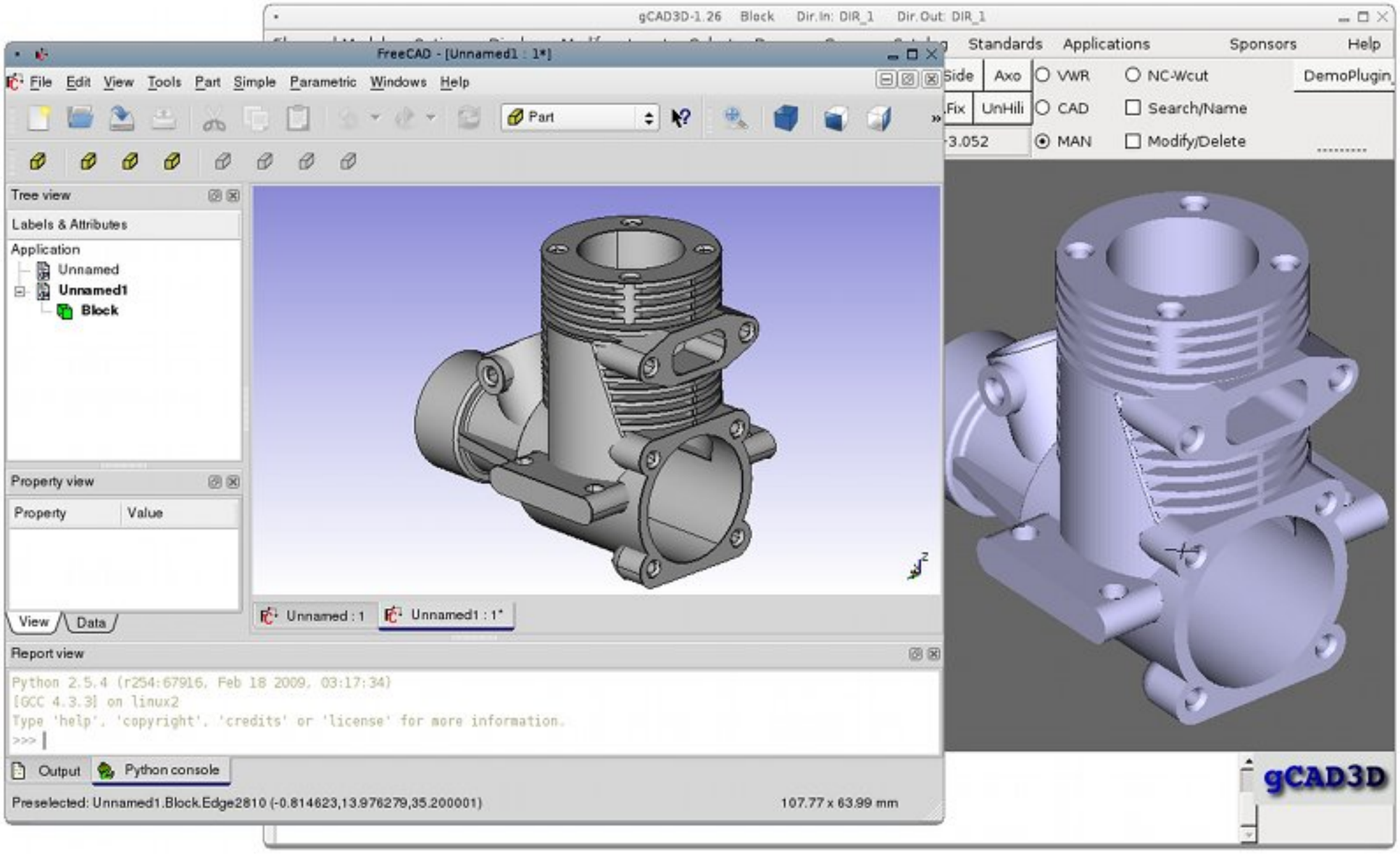
AutoCAD

Blender

File Add Timeline Game Render Help
Preview
Mat
World
Lamp
Brush
Alpha
Default Vars
Mesh
Sculpt
Auto Smooth
Degr: 30
TexMesh:
Sticky
Make
UV Texture
New
Vertex Color
New
Centre
Centre New
Centre Cursor
Double Sided
No V.Normal Flip
Multires
Delete Multires
Add Level
Level: 6
Del Lower
Del Higher
Edges: 4
Rendering
Pin: 1
Render: 1
Brush
Common
Texture
Fade
Default
Space: 0
pores
Clear
Drag
Tile
3D
Size: 1.00
Link and Materials
Modifiers
Shapes
Add Modifier
To: Togue
Sculpt Properties
Brush
Draw
Smooth
Pinch
Inflate
Grab
Layer
Shape
Add
Sub
Airbrush
Size: 42
Strength: 7
Symmetry
X
Y
Z
Scene
RenderLayers
World
Camera
Eyes
Gum
Head
Ring_01
Ring_02
Teeth
Cube
Modifiers
Togue
Plane
View
Search
All Scenes
Anim settings
TrackX
UpX
Draw Key
Draw Key Se
Powertrack
SlowPar
DupliFrames
DupliVerts
DupliFaces
DupliGroup
DupSta: 1
DupOn: 1
DupEnd: 100
DupOff: 0
Offs Ob
Offs Par
Offs Particle
0.0000
TimeOffset: 0.00
Automatic Time
PrSpeed
Draw
Layers
Drawtype
Draw Extra
Shaded
Bounds
Name
Solid
Box
Axis
Wire
TexSpace
Wire
Bounds
Transp
Xray
Object and Links
OB:Togue
Par:
Add to Group
PassIndex: 0
Constraints
Add Constraint
To Object: Togue
(1) Togue
View
Select
Sculpt
Sculpt Mode
Panels


File Edit View Camera Draw Tools Window Help
Google SketchUp
Google SketchUp
Version 6.4.112
Info: http://sketchup.google.com/
Support: http://sketchup.google.com/gsu6/support.html
© Google Inc. 2007
Patent 6,628,279
Sketchup contains PaintLib code. PaintLib is copyright
1996-2002 Ulrich von Zadow and other contributors.
OK
Ready
© katsbits.com

FreeCAD


gCAD3D-1.26 Block Dir.In: DIR_1 Dir.Out: DIR_1
FreeCAD - [Unnamed1 : 1*]
File Edit View Tools Part Simple Parametric Windows Help
Part
Tree view
Labels & Attributes
Application
Unnamed
Unnamed1
Block
Property view
Property
Value
View
Data
Unnamed : 1
Unnamed1 : 1*
Report view
Python 2.5.4 (r254:67916, Feb 18 2009, 03:17:34)
[GCC 4.3.3] on linux2
Type 'help', 'copyright', 'credits' or 'license' for more information.
>>>
Output
Python console
Preselected: Unnamed1.Block.Edge2810 (-0.814623,13.976279,35.200001)
107.77 x 63.99 mm
Standards
Applications
Sponsors
Help
Side
Axo
VWR
NC-Wcut
DemoPlugin
Fix
UnHili
CAD
Search/Name
3.052
MAN
Modify/Delete
gCAD3D

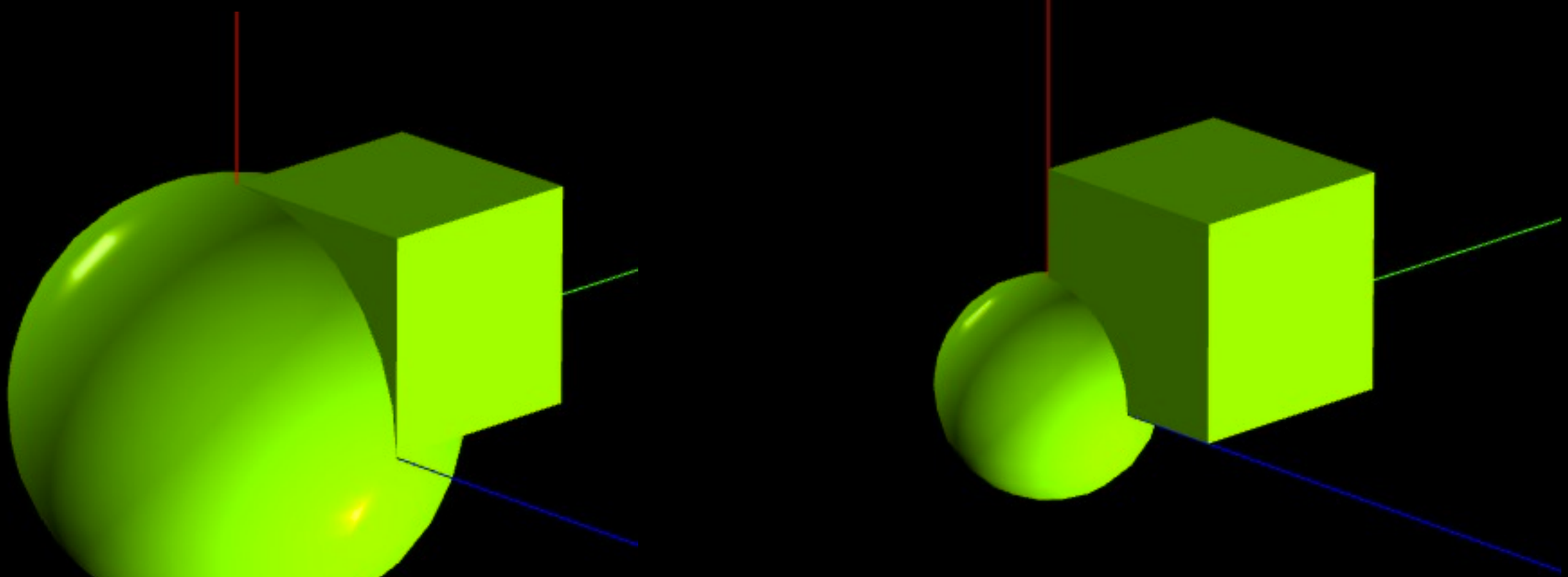
Epiphany

Thursday, 9 June 2011

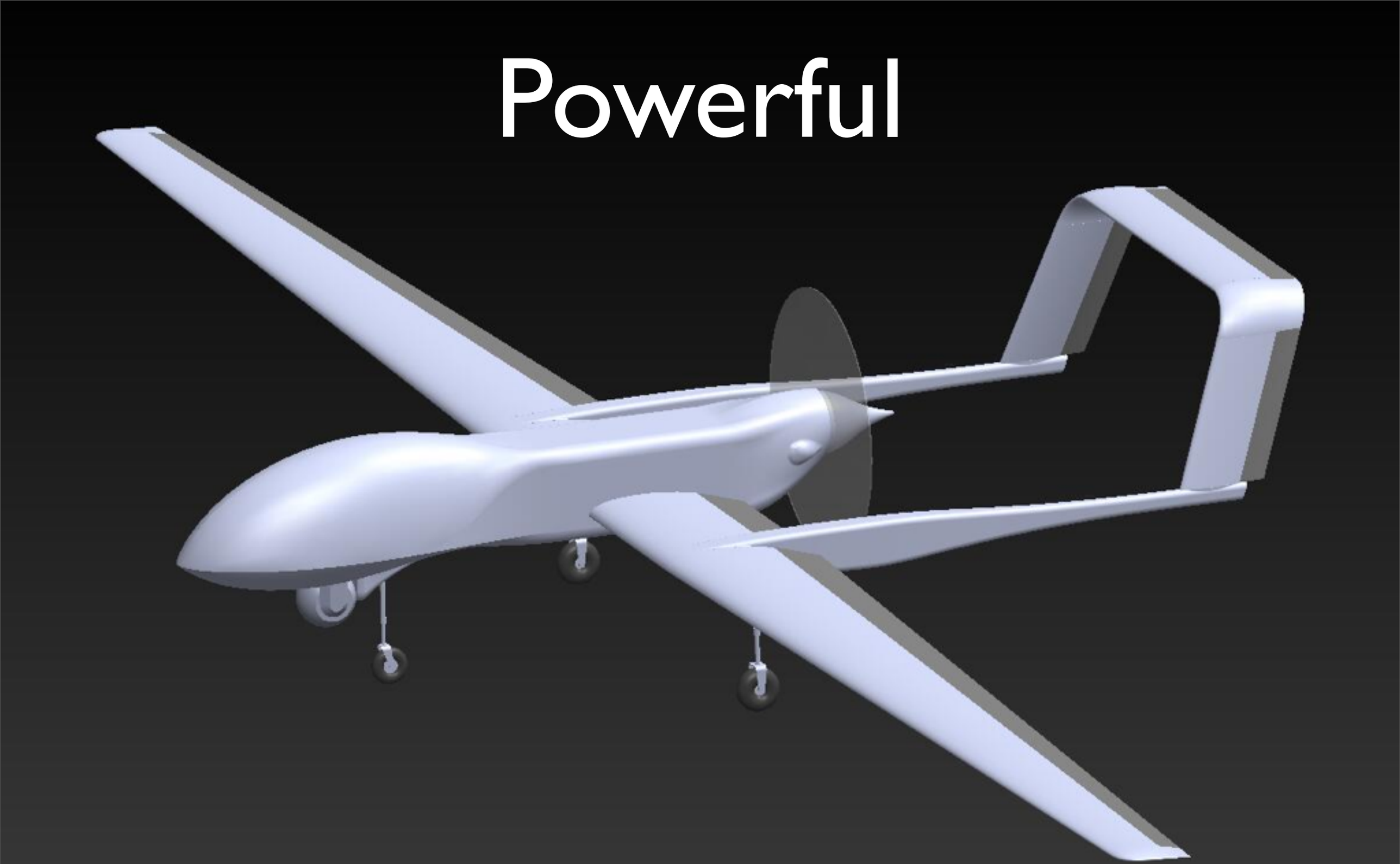
Browser 3D modelling

- Parameterised
- Powerful
- Accessible

Parameterised



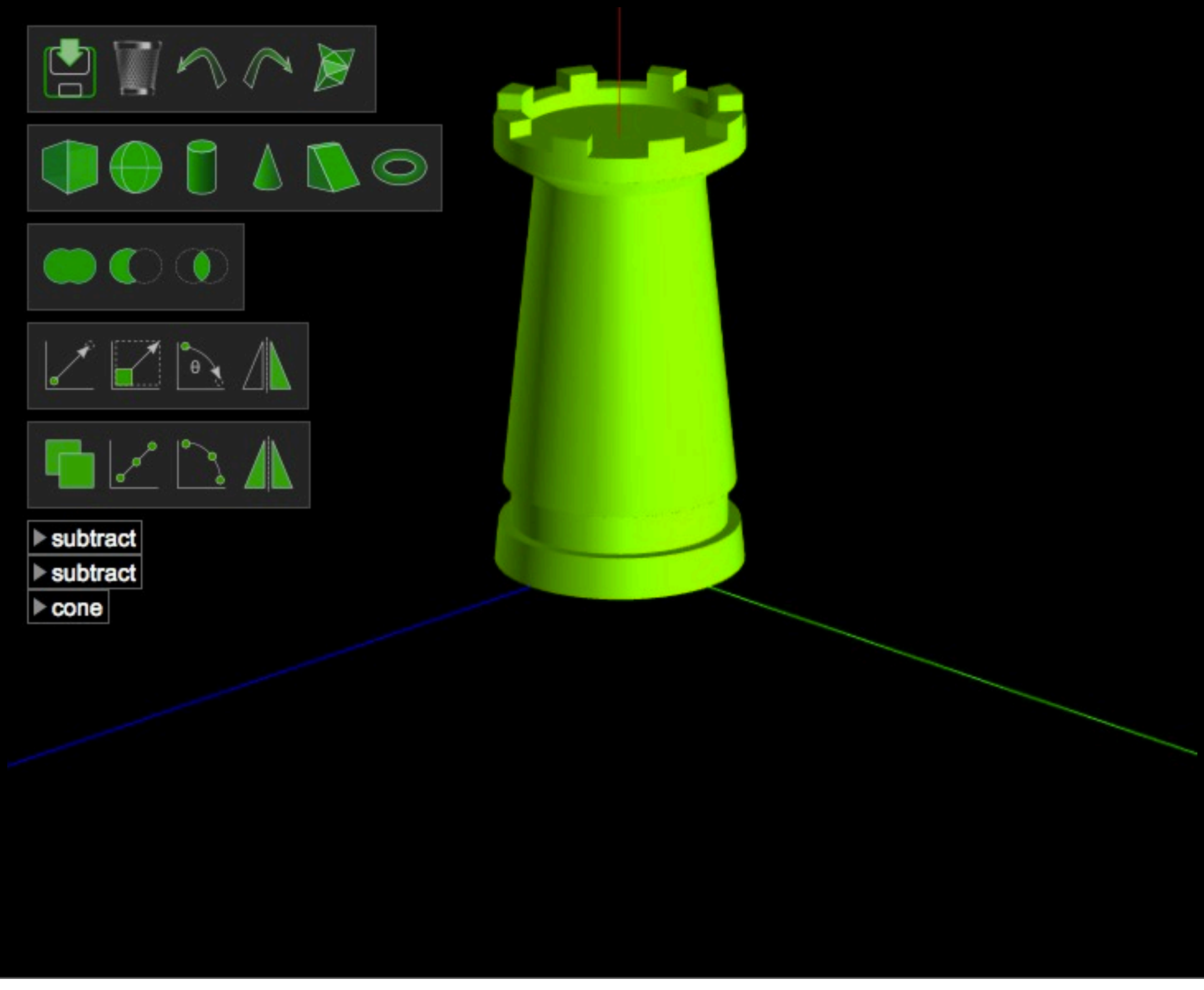
Powerful



Accessible

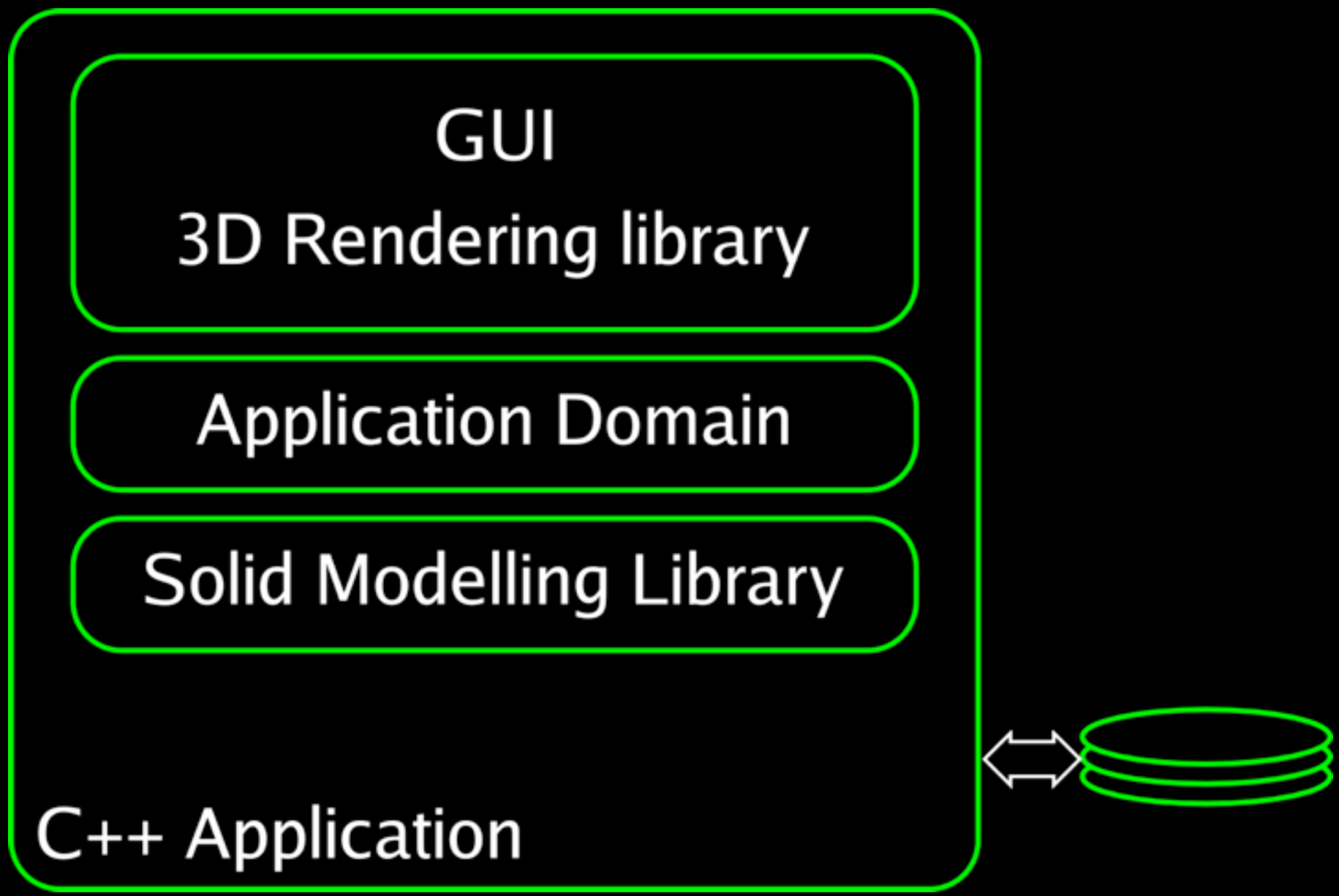
- It must run in Africa

Shapesmith

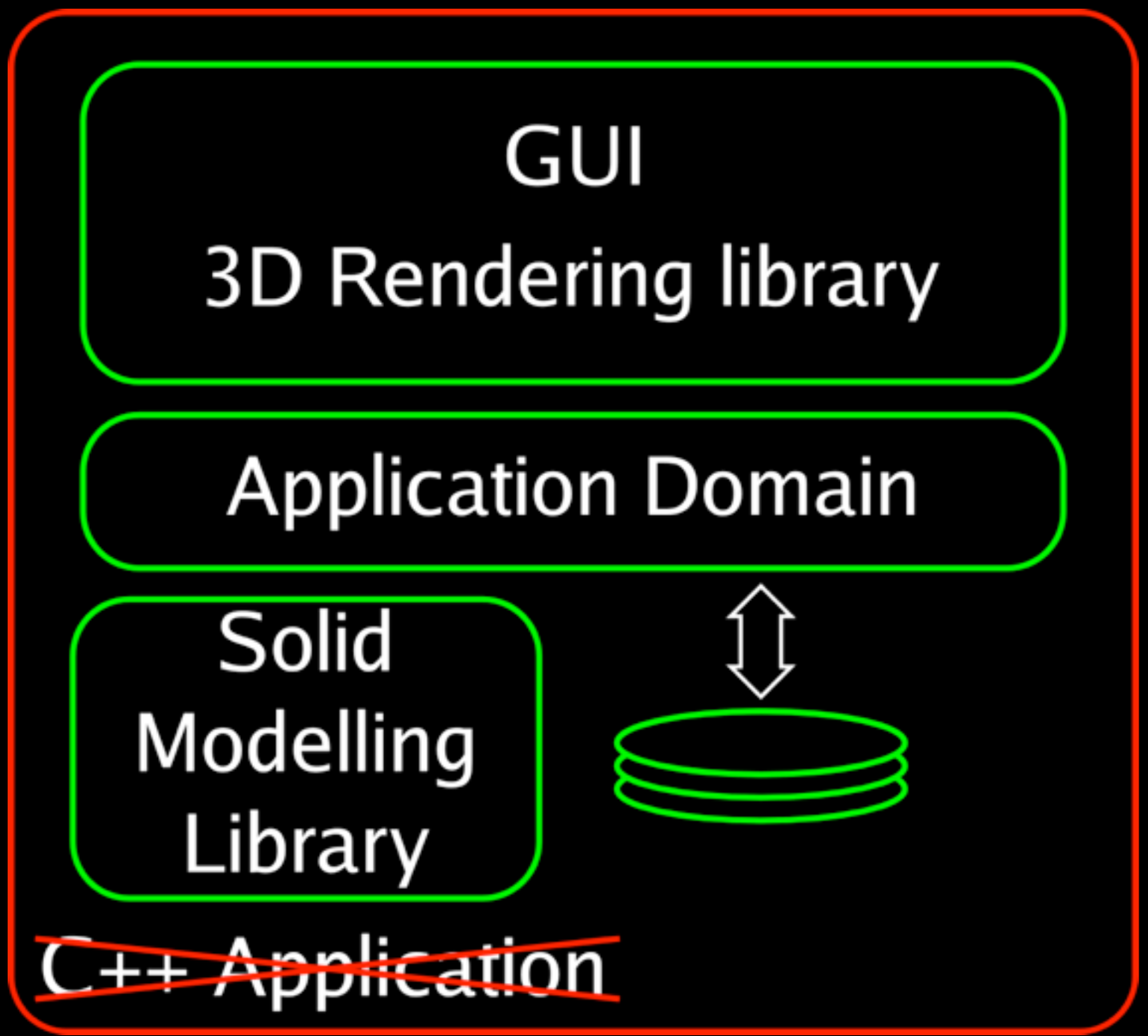


How does it work?

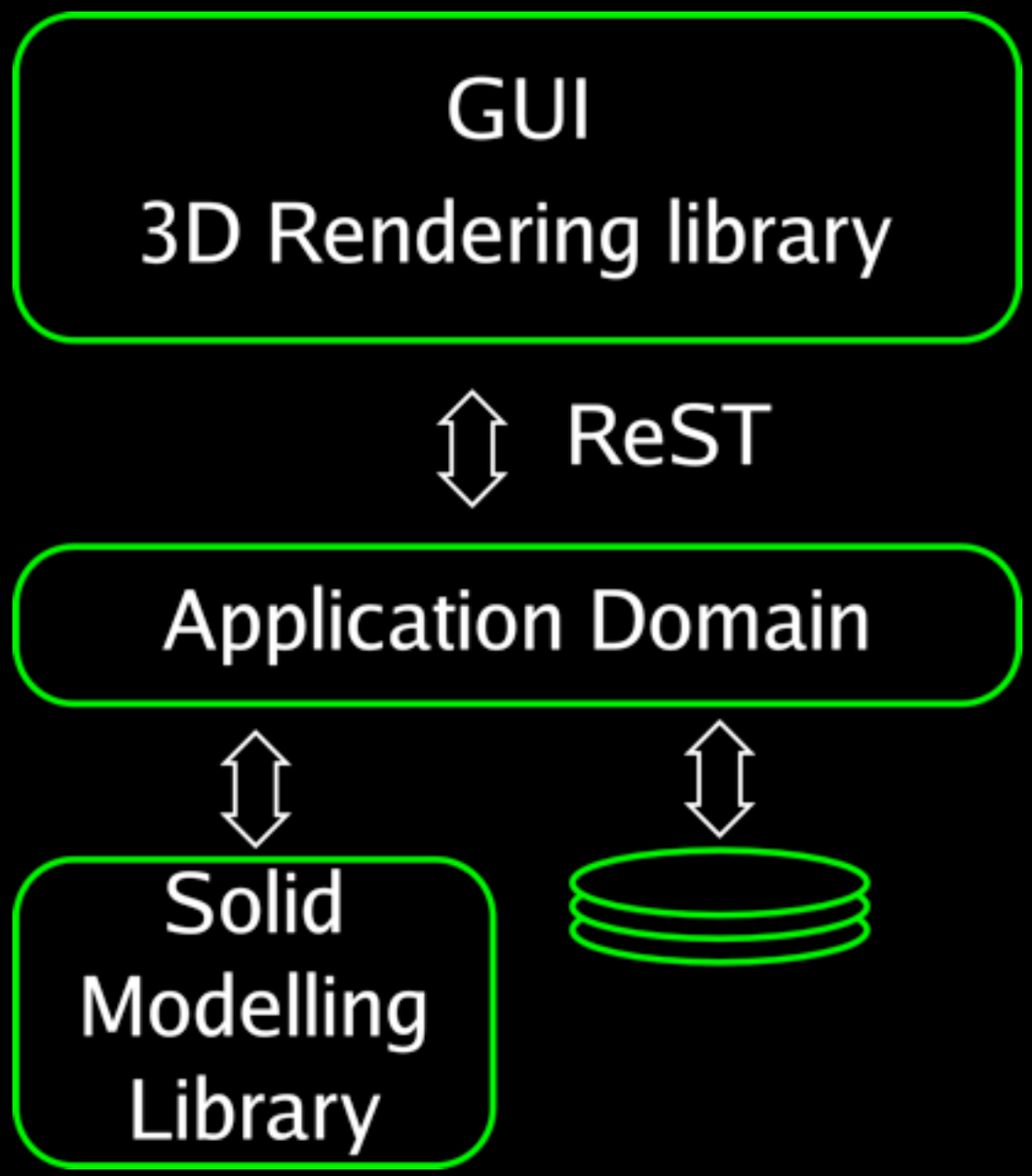
Traditional CAD application



Transition A



Transition B



Shapesmith prototype

Browser/Javascript

WebGL

SceneJS

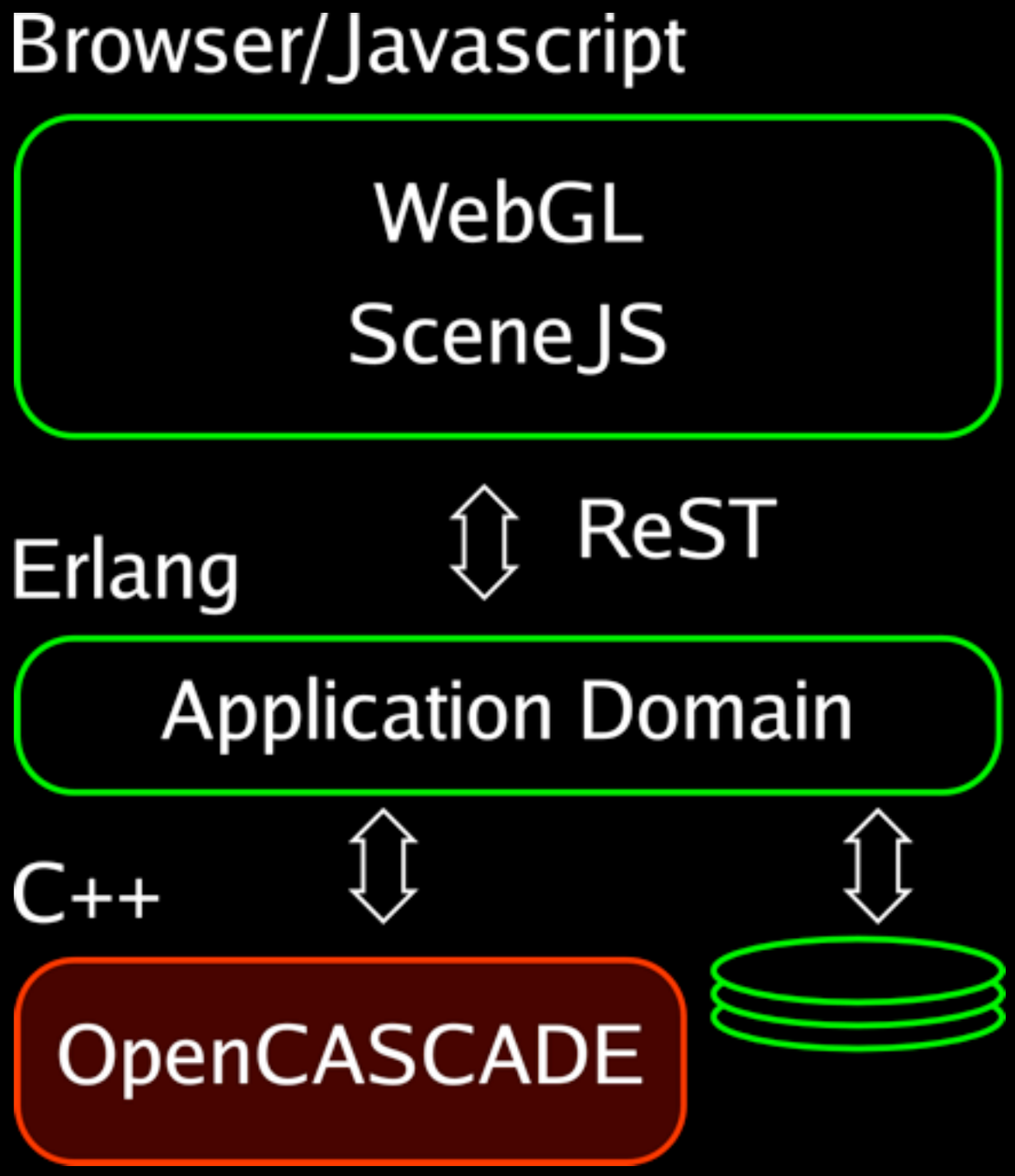
Erlang ⇕ ReST

Application Domain

C++ ⇕ ⇕

OpenCASCADE

Problem!


Browser/Javascript
WebGL
SceneJS
ReST
Erlang
Application Domain
C++
OpenCASCADE

Representations

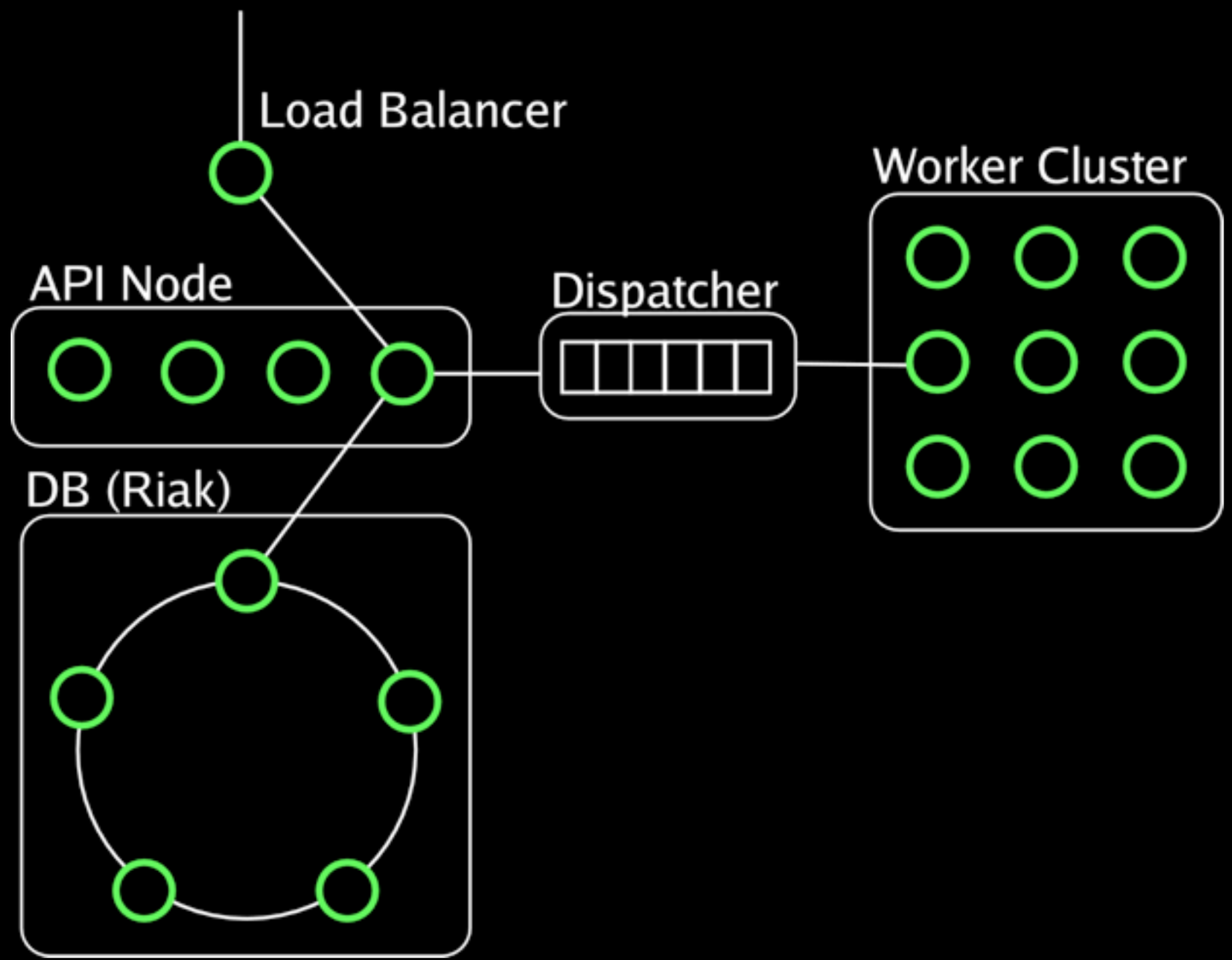
- Geometry

```
{“type” : ”sphere”, “radius” : 1.0 }
{“type” : ”union”, “children” : [...] }
```

- BRep [+ Serialized]

- Mesh [+ Serialized]

Shapesmith v0.1



Why Erlang?

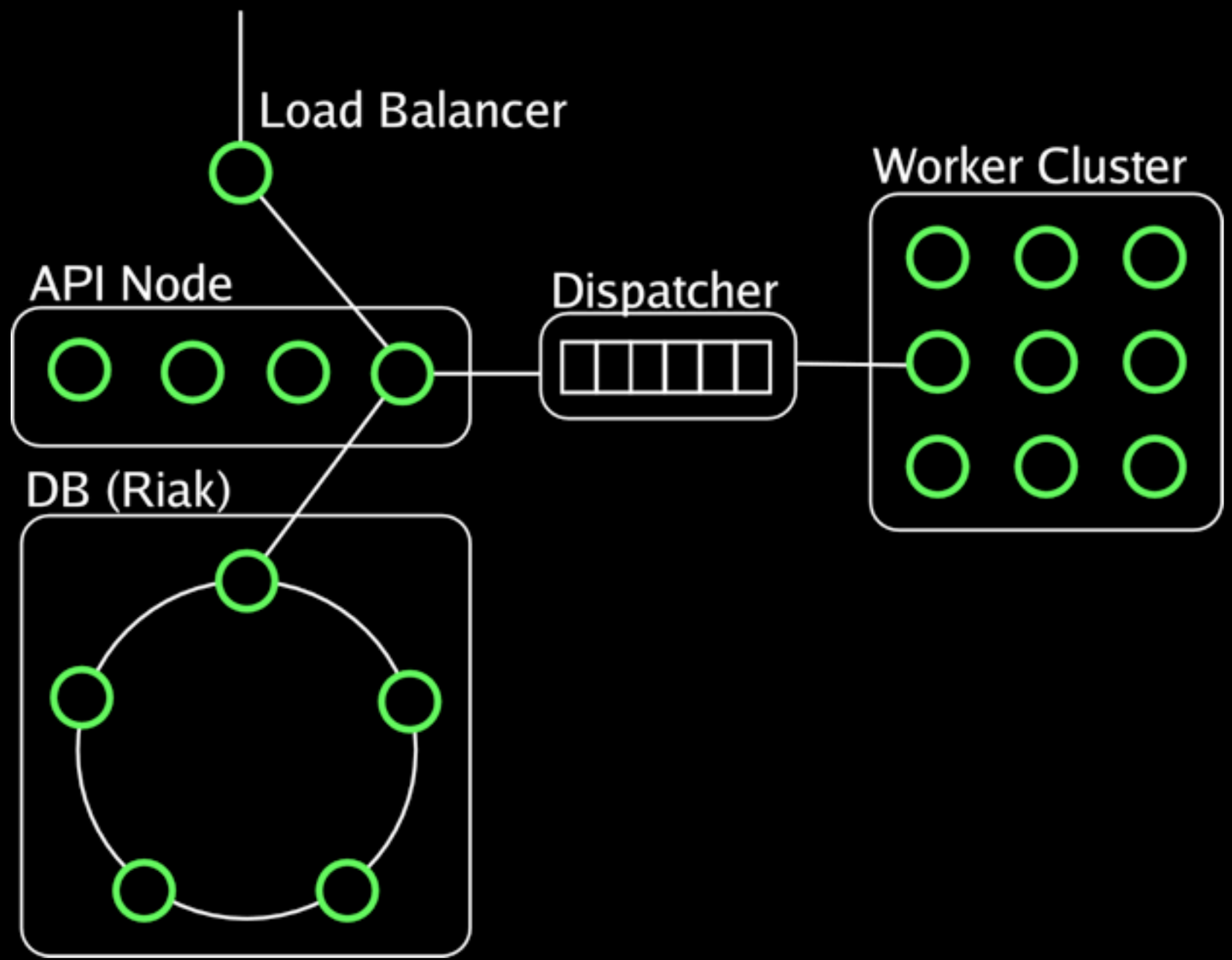
Memory footprint

- worker process ~ 27MiB
- beam ~ 10MiB
- Java VM ~ 256-512 MiB

Simple costs less

- Functional = less complexity
- Reasonable concurrency
- 1 developer @ $6000/month OR 400 EC2 micro nodes @ $15/month

Elasticity & Distribution



But...

3DTin

www.3dtin.com

iPod Touch by cedric.lach1

0.0 0 3 more

Login

0000

0000

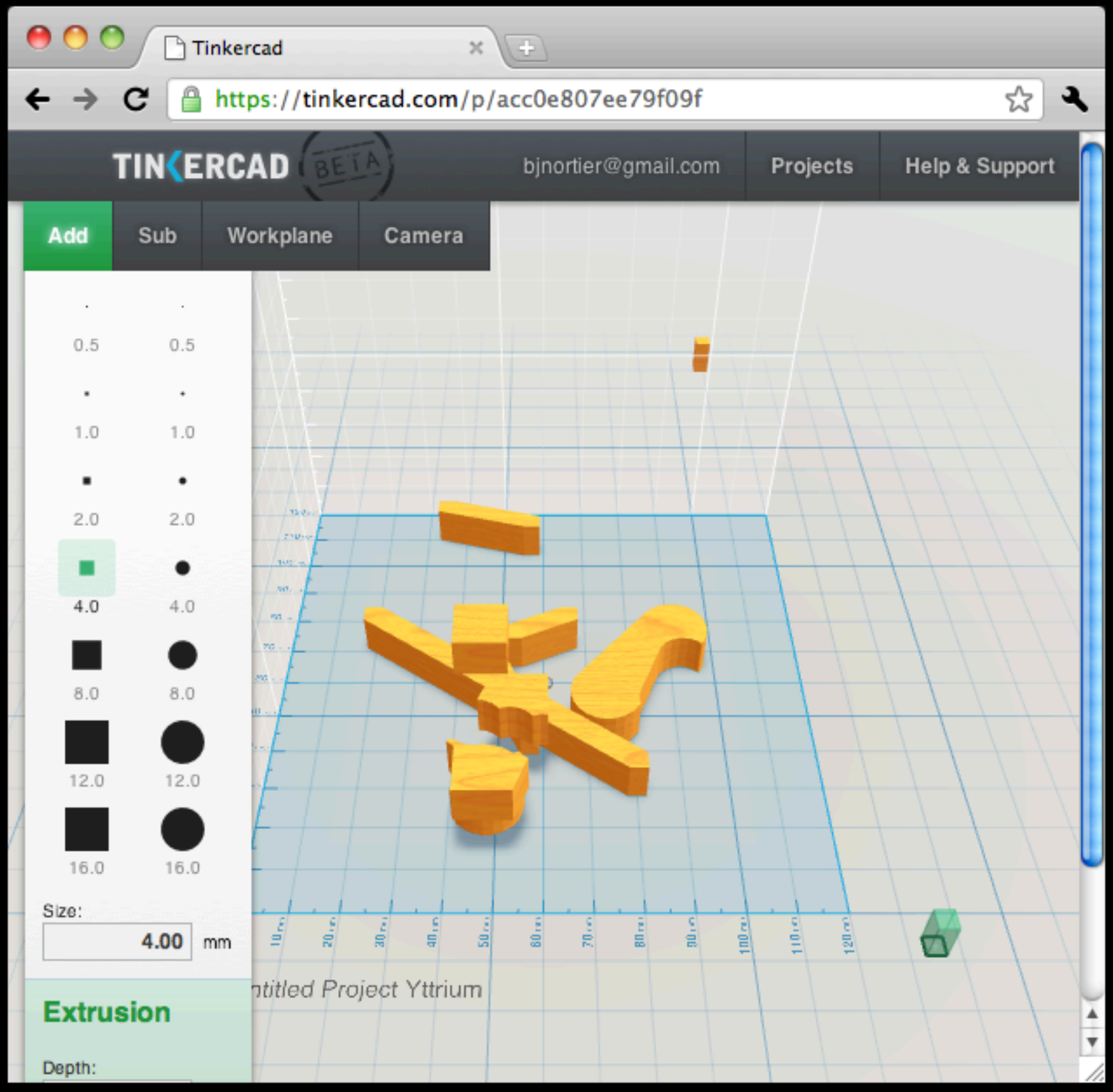
Leaders

Facebook | Twitter | Blog | SDK | Feedback | Credits | Terms of Use | Contact

Locale English

Hide

Thursday, 9 June 2011


Tinkercad
https://tinkercad.com/p/acc0e807ee79f09f
TINKERCAD
BETA
bjnortier@gmail.com
Projects
Help & Support
Add
Sub
Workplane
Camera
0.5
1.0
2.0
4.0
8.0
12.0
16.0
Size:
4.00
mm
Extrusion
Depth:
ntitled Project Yttrium

Autodesk® 123D™ Beta

Create it. Make it.

A new home for making things

About 123D

More buts...

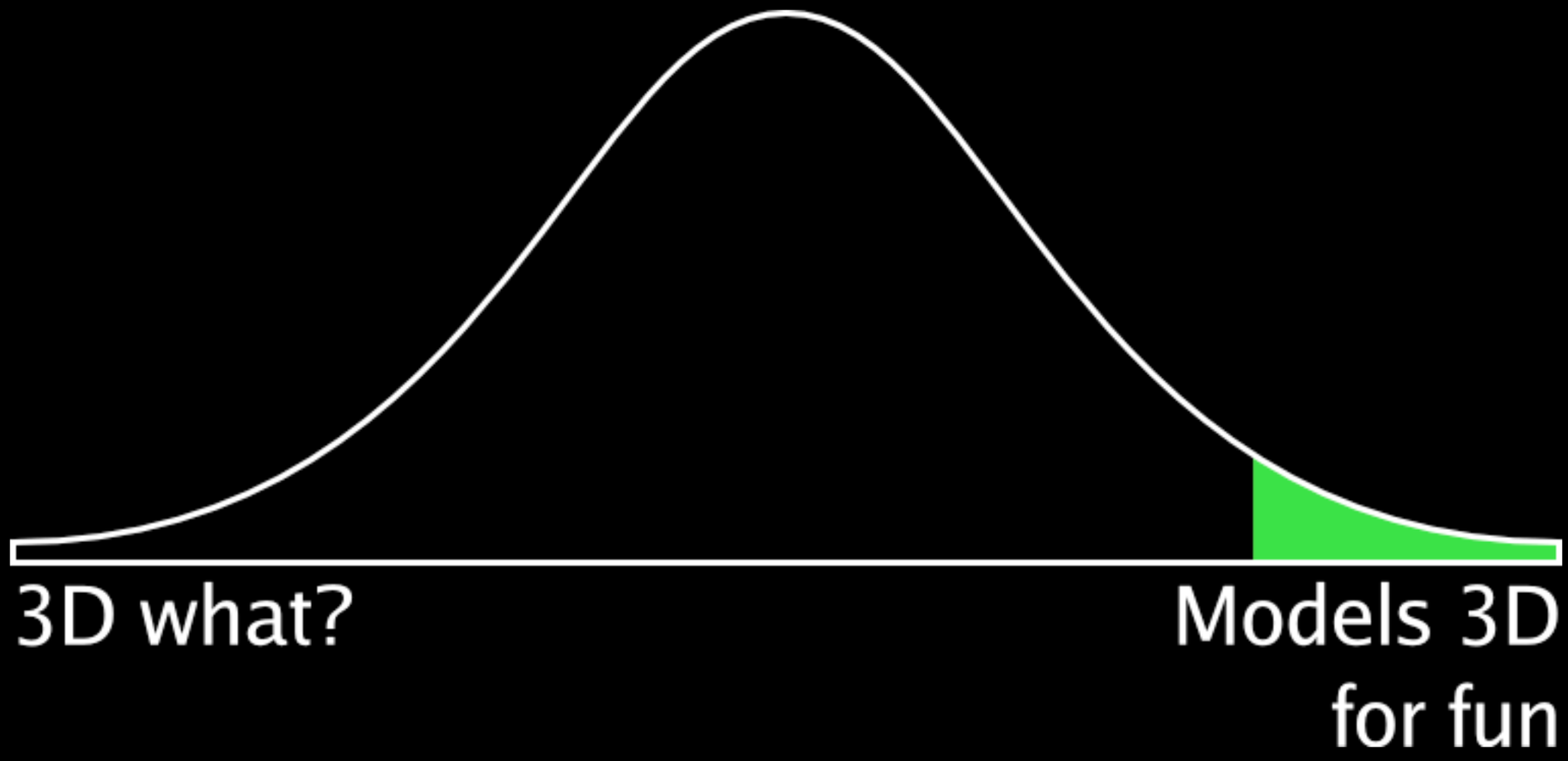
- BRep is n^3
- BRep operations are not divisible in OpenCASCADE
- Erlang + JSON

The future

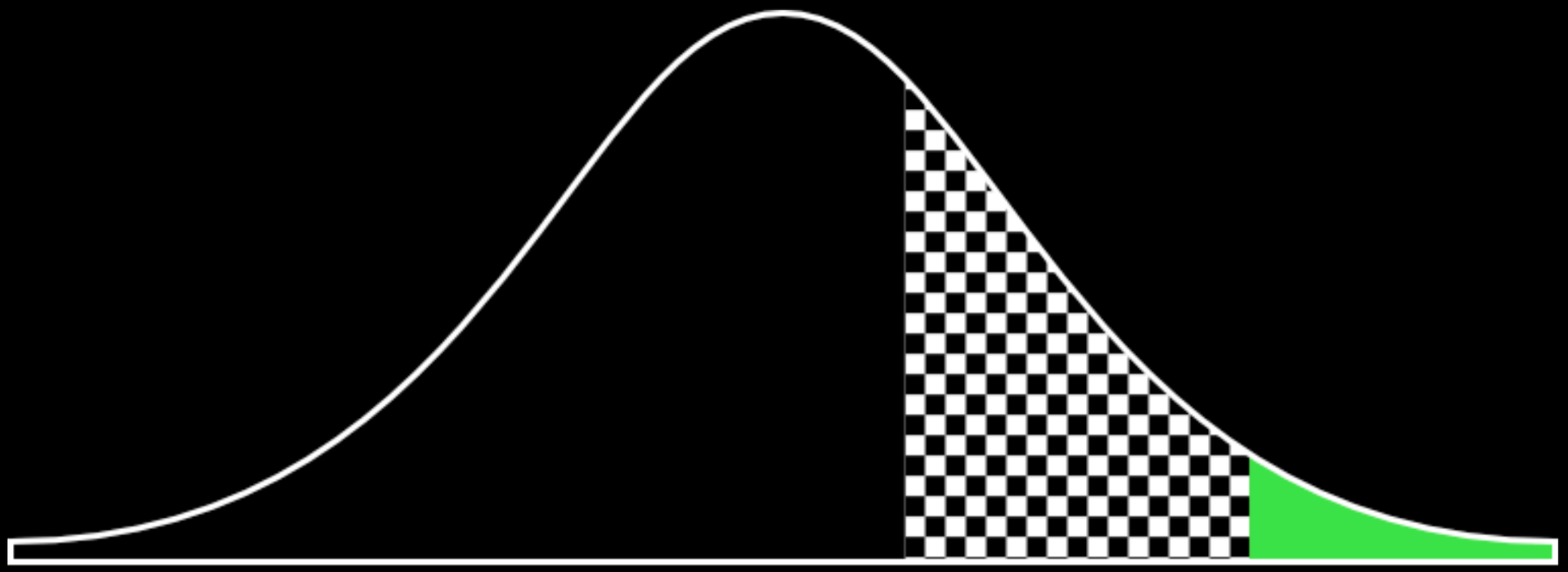
The future

- 2D, 1D primitives. 1D to 2D, 2D to 3D
- Ease of use (workplane, transparency)
- Open source release
- Parametric & template-based modelling

Template-based modelling



Template-based modelling



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