
McKinney

Hexayurt Project

Open Hardware Shelter Technology

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Larry Wall's 3 Virtues of a Programmer

- **Laziness**
  - *do it the easy way*
- **Impatience**
  - *do it fast*
- **Hubris**
  - *do something amazing*

And suppose...

3 Virtues of an ~~Programmer~~ Architect

Archihack

Hackitect

- **Laziness**
  - *what building is **easy**?*
- **Impatience**
  - *what building is **fast**?*
- **Hubris**
  - *what building is **scalable**?*

Burning Ice, Brussels

7 hexayurts
150 sq m.

6 people
2 easy days

Maslowtopia, Burning Man
40 hexayurts

sat
view

(google hexayurt +)

tape

tape anchor

polyiso panels

sat view

Maker Faire Newcastle

6 panels for the walls

*actually 2250 mm for overhang

6 panels cut for a roof

30 wood block joints

Standard Wood Hexayurt

12 panels, 3 2x4s, 200 screws

Thank you!

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what we have learned?

First hexayurt, Burning Man 2003

Configuration

- **Geometry**
  - *what hexayurts exist?*
- **Materials**
  - *what panels are available?*
- **Construction**
  - *how do we make hexayurts?*

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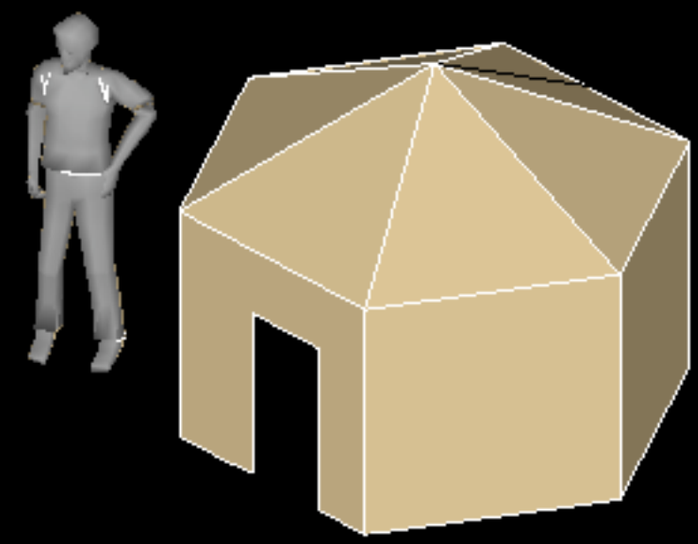
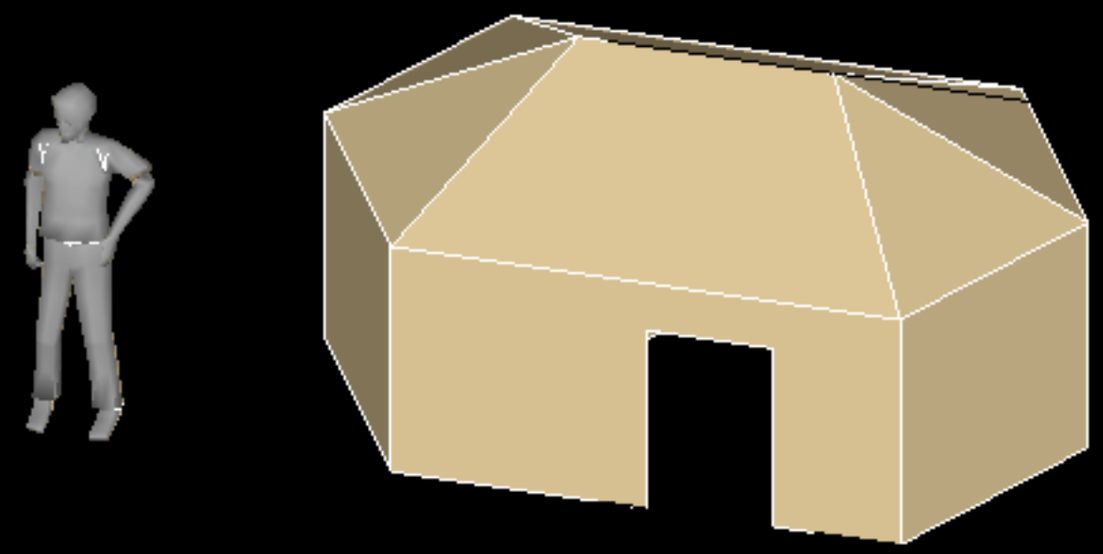
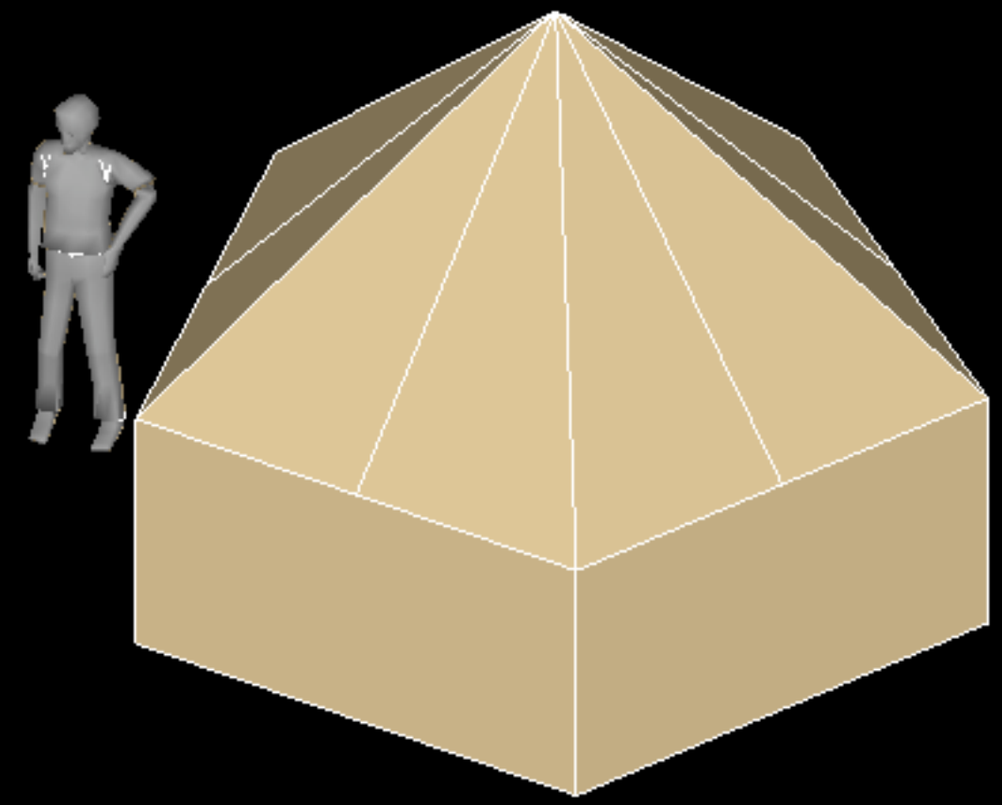
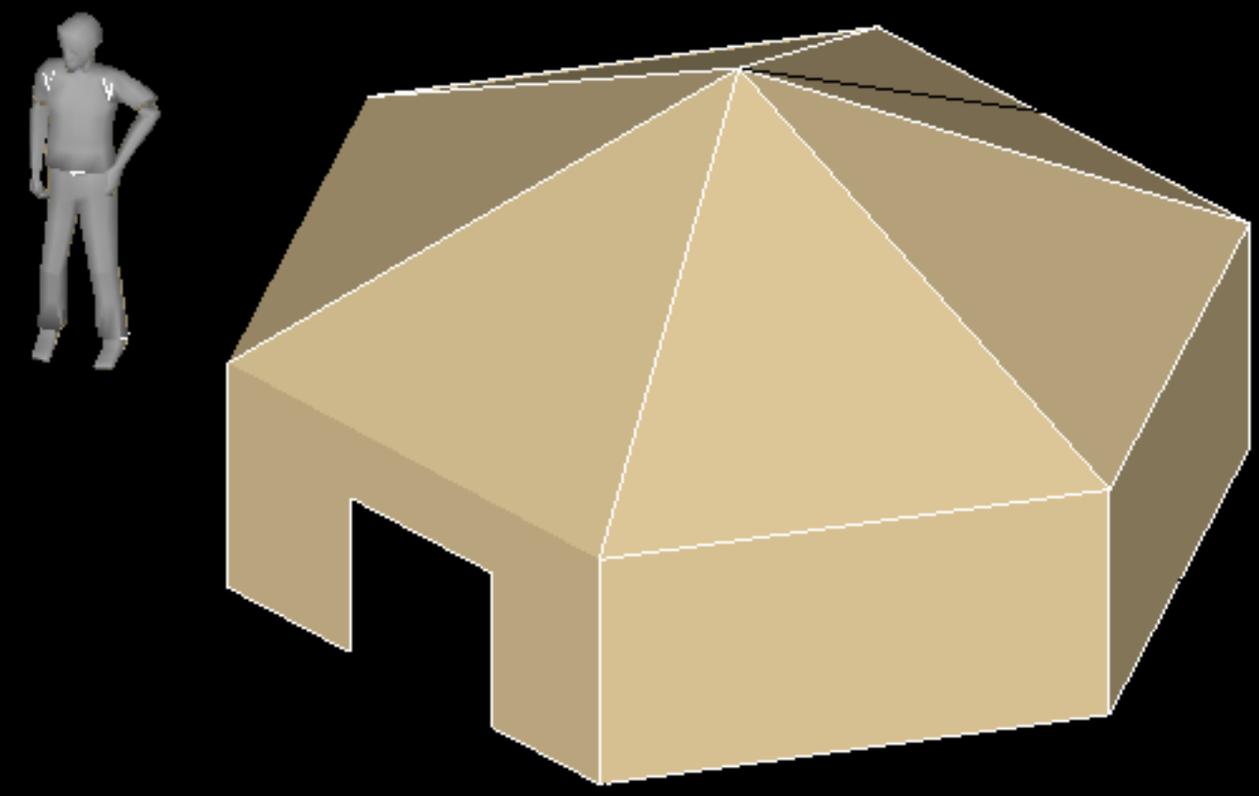
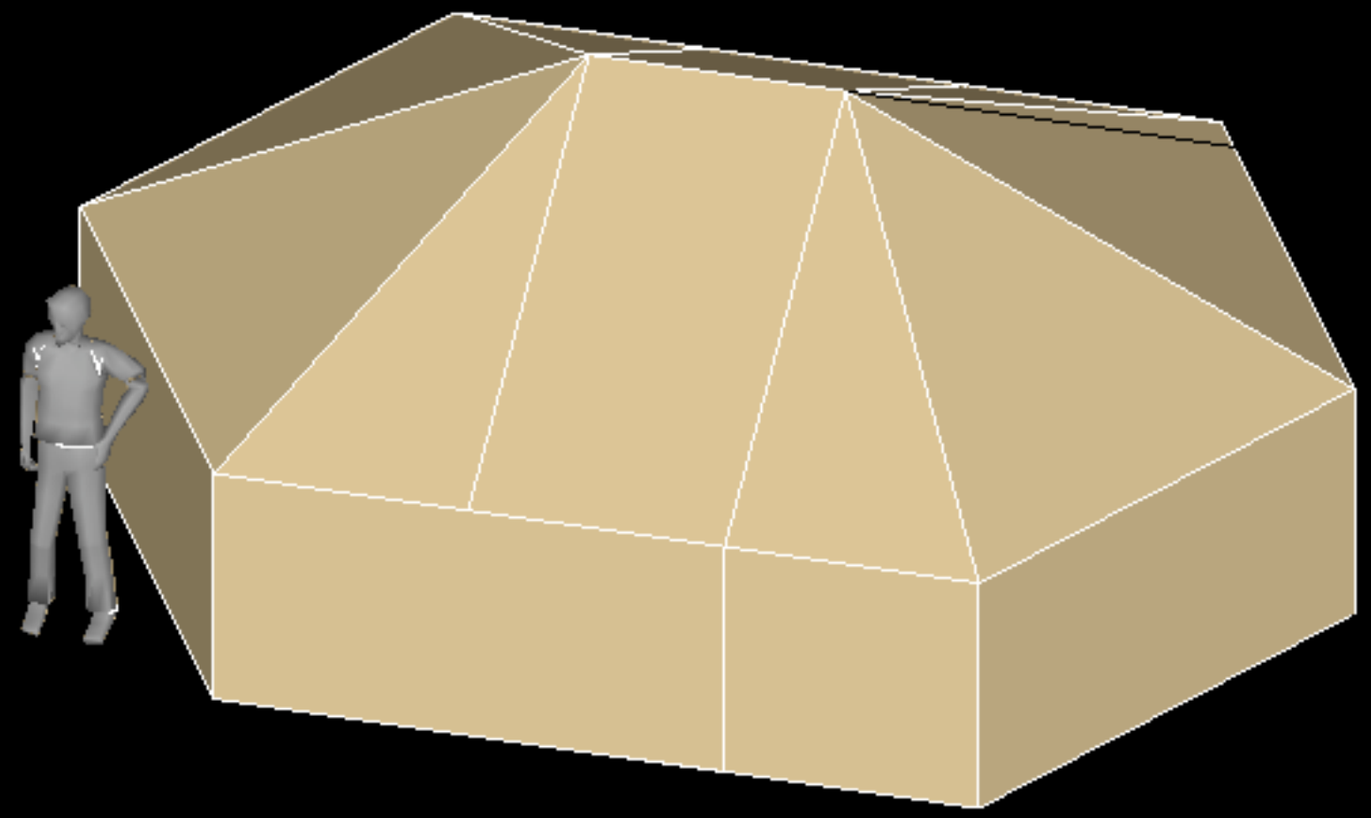
The Hexayurt Family

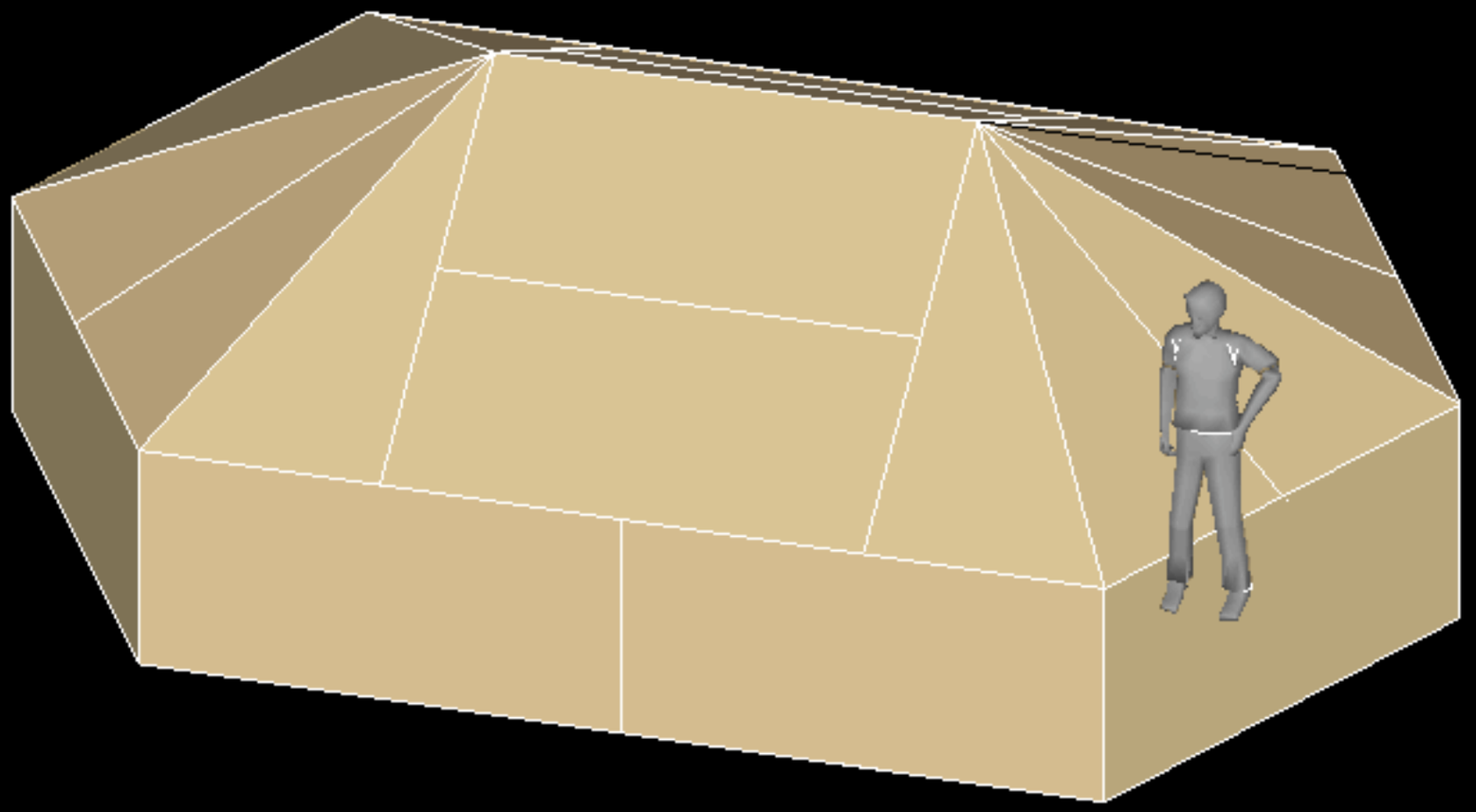


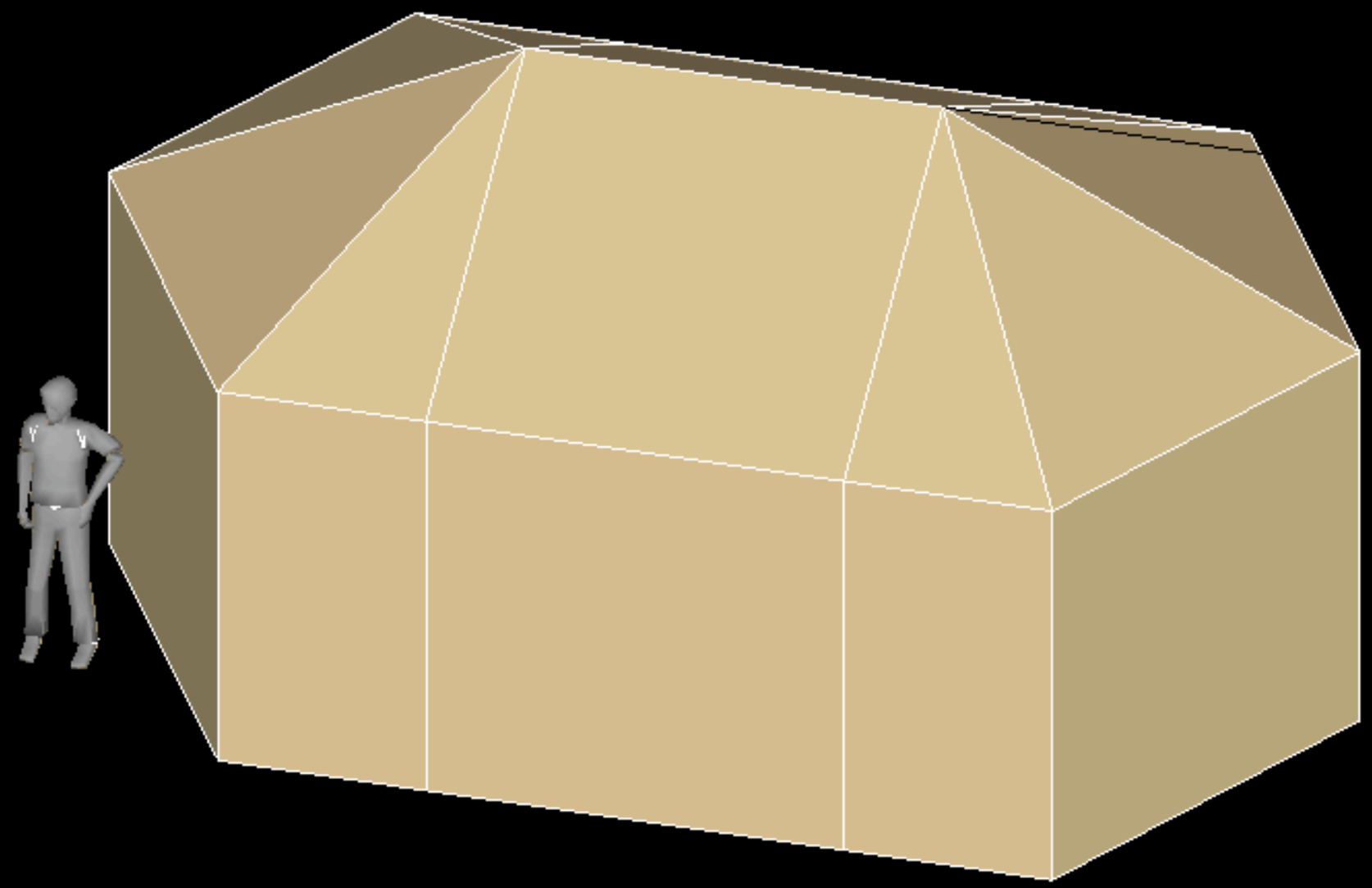


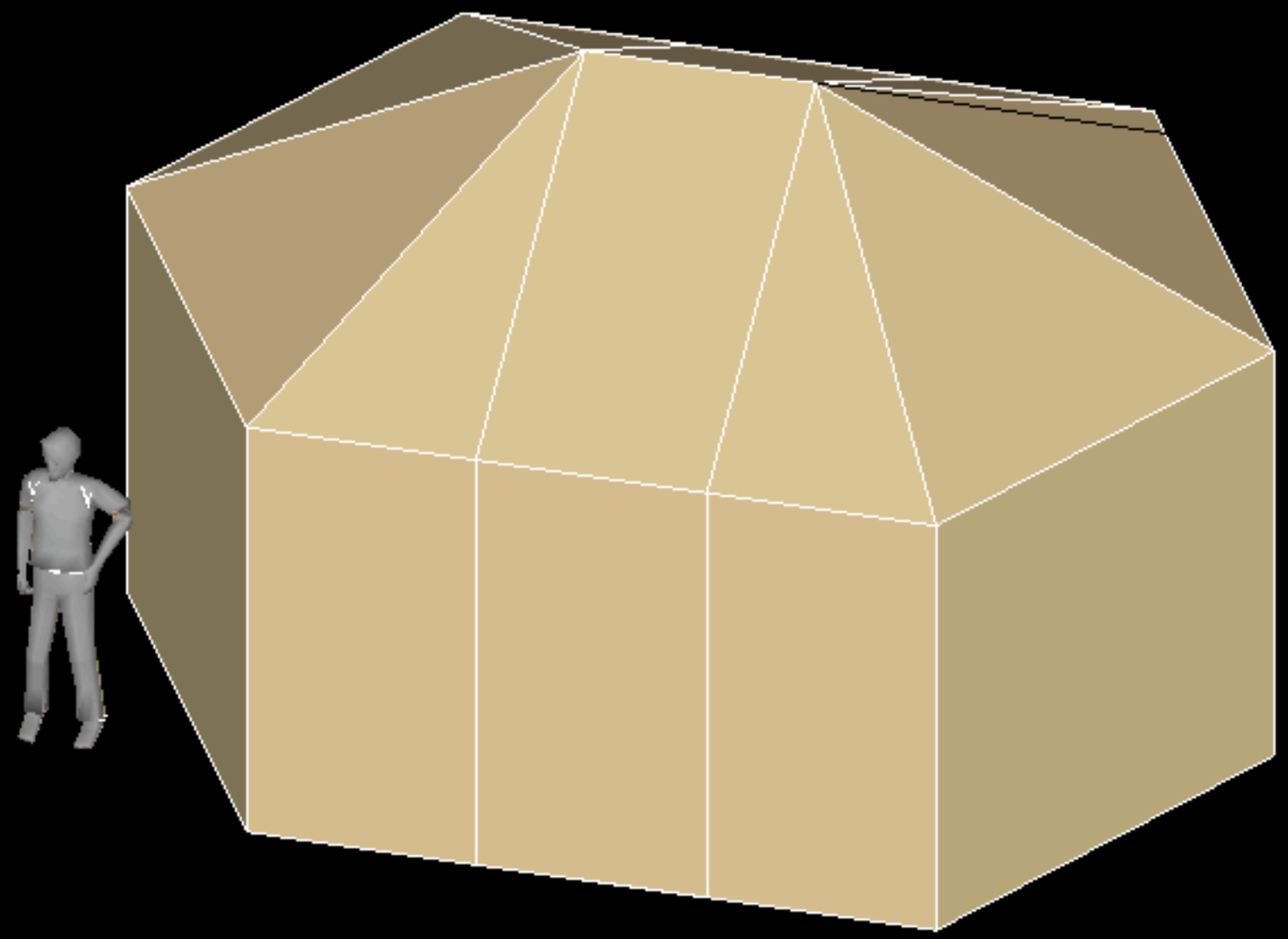


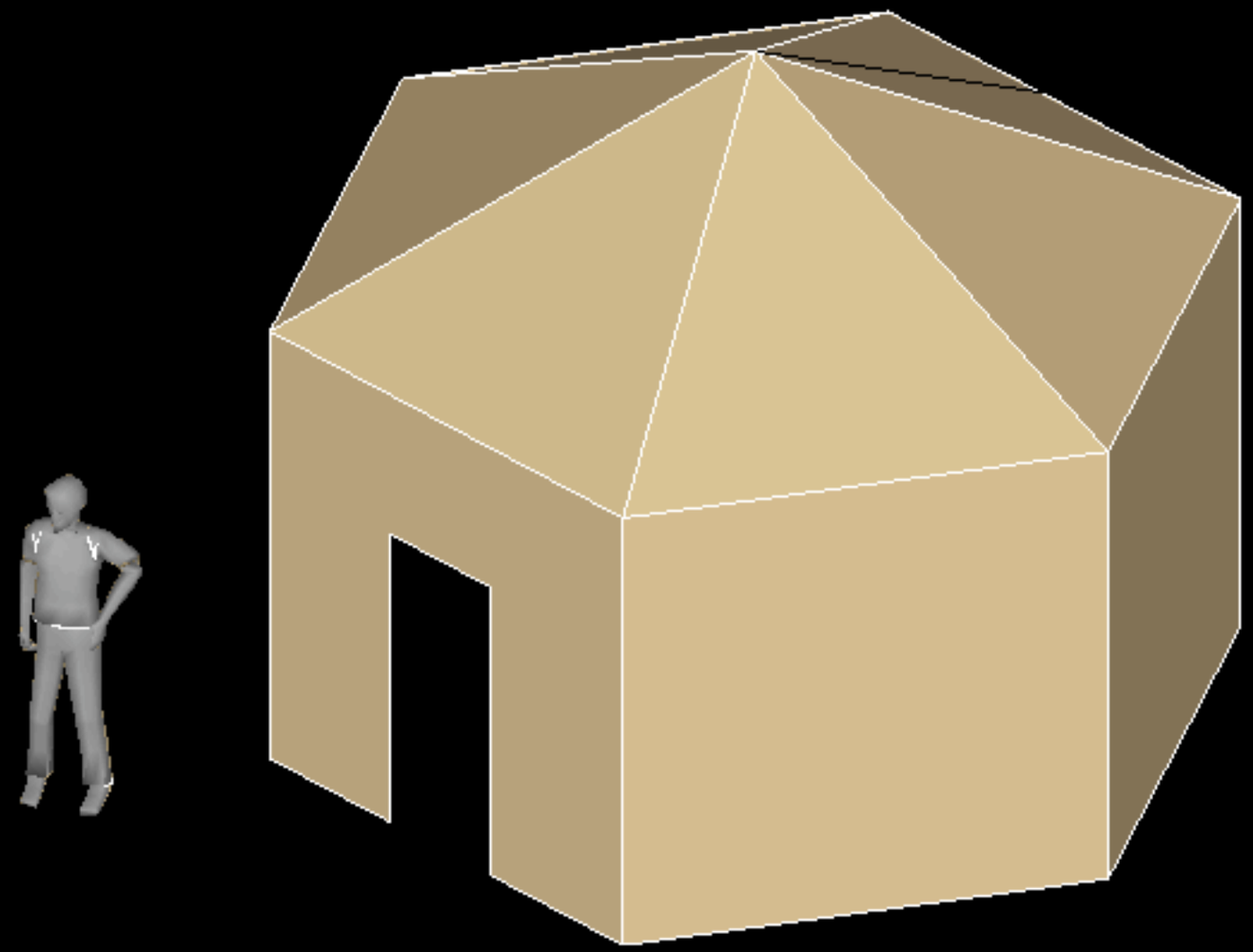


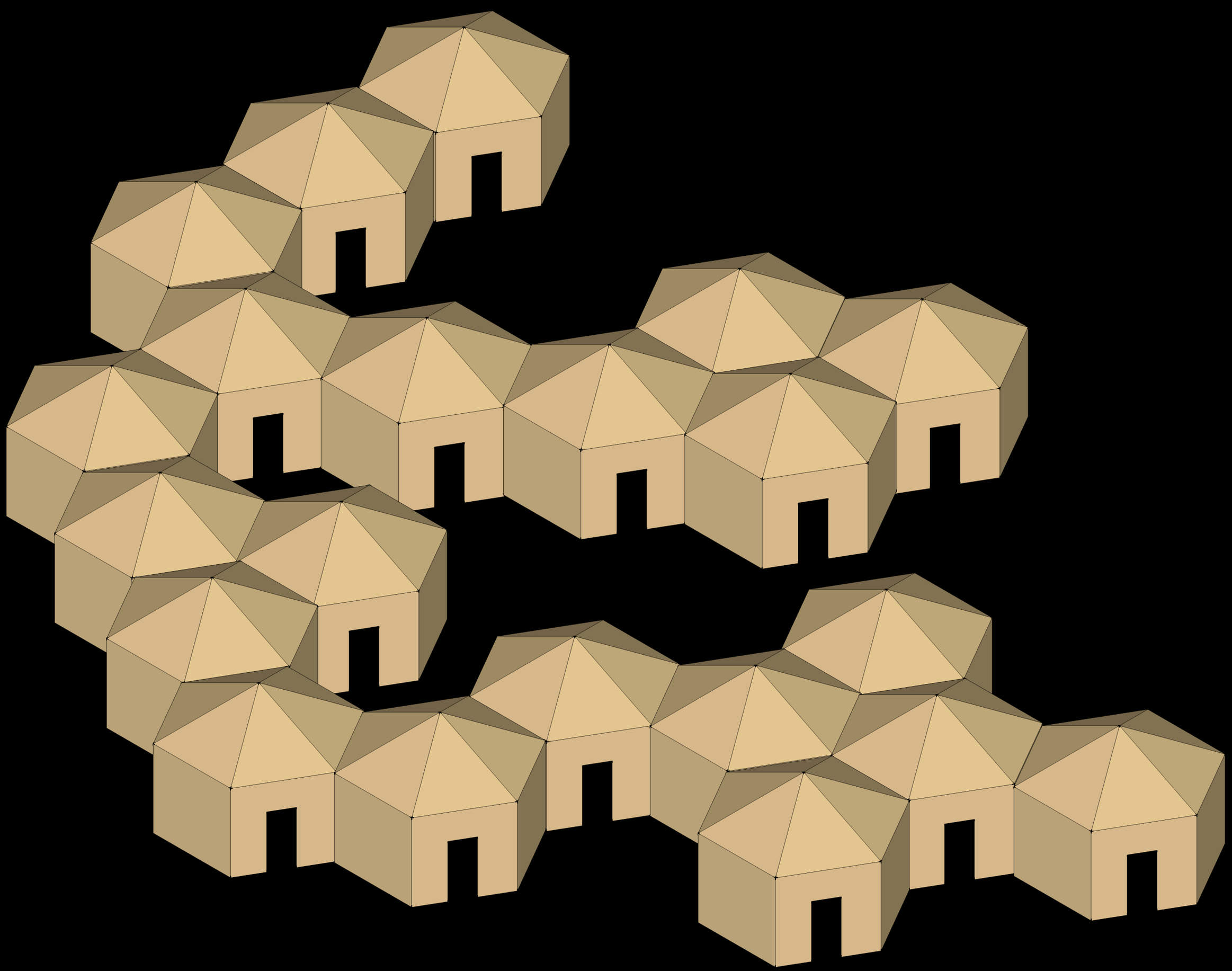






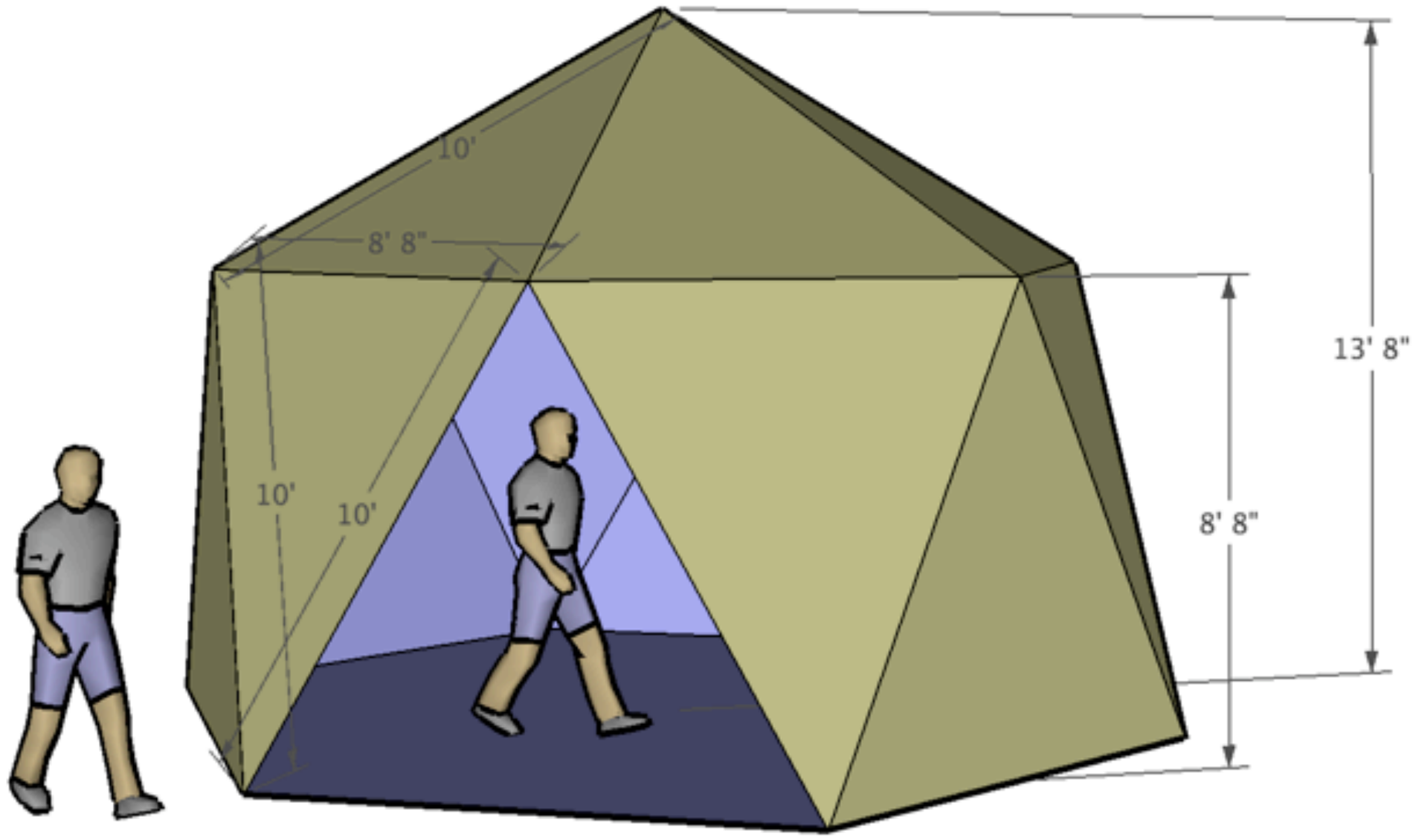






This is a Large Pole Hexayurt

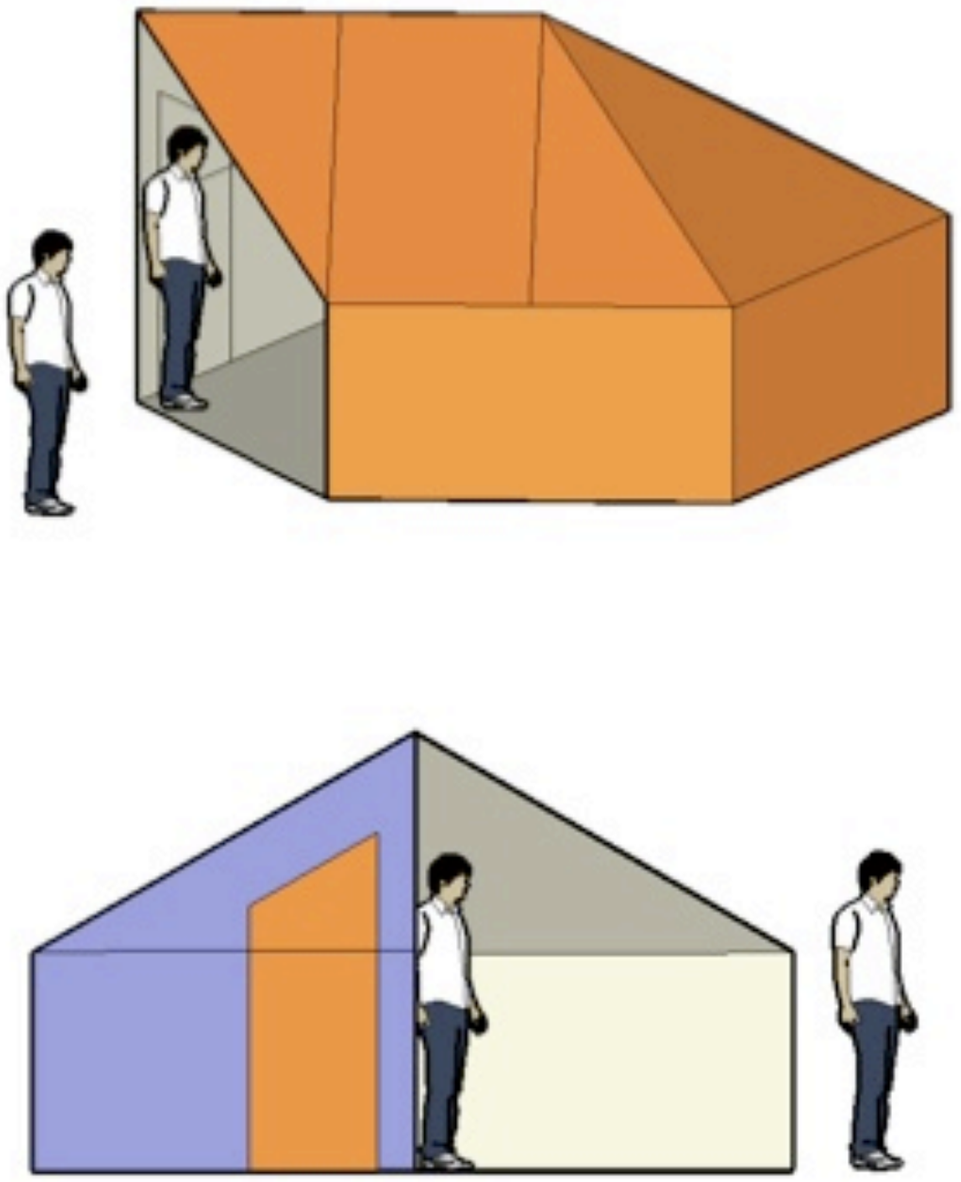
It is made from 30 pieces of conduit, using standard geodesic dome construction: bang flat poles, drill holes, go.
Because the angles are steep, you may wish to pre-bend them to about 30 degrees.
24 of the poles are used full length. Six are cut to 8' 8". The short poles are used along the roof line.
They are shorter so that the walls will be vertical.
The building is 8' 8" at the wall, 13' 8" at the point. Floor space is 300 square feet.
The six equilateral "wall" triangles are all ten feet on a side. 60" fabric could cover these well (a 10' length cut into two along the diagonal, th
sewn together along the edge, but by the time there is a hem and grommits to attach to the pole it could be a little small.
Perhaps use a "spacer" six inches or a foot wide when sewing those panels (sewn vertically).
Designed by shivanathji@gmail.com (Vinay Gupta). Design placed into the public domain. Please see http://mindismoving.org/hexayurt/

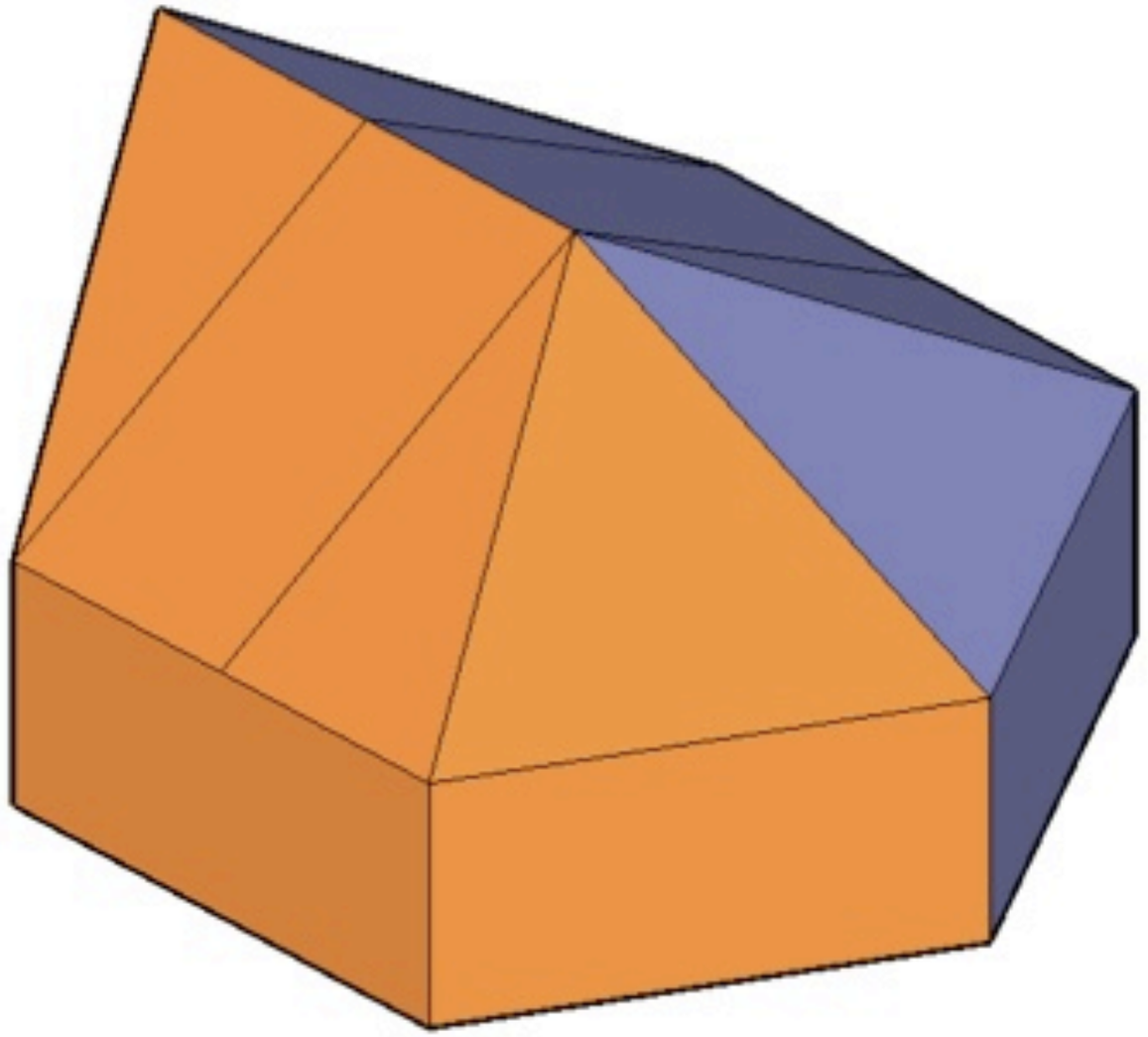


frame hexayurt

New Designers

- H13 hexayurt by Scott Davis and Dylan Toymaker
- nearodesics by Edmund Harriss





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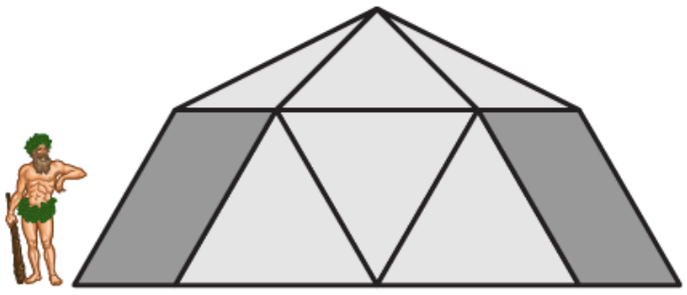
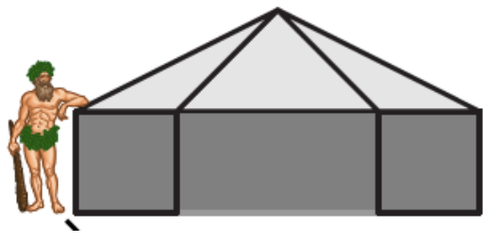
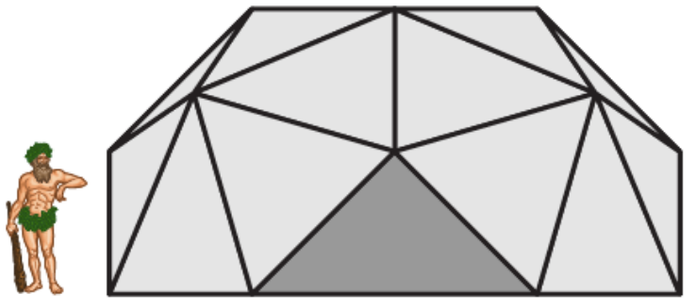
H13 one more panel full 2.4m door way



40 sq m



15 sq m

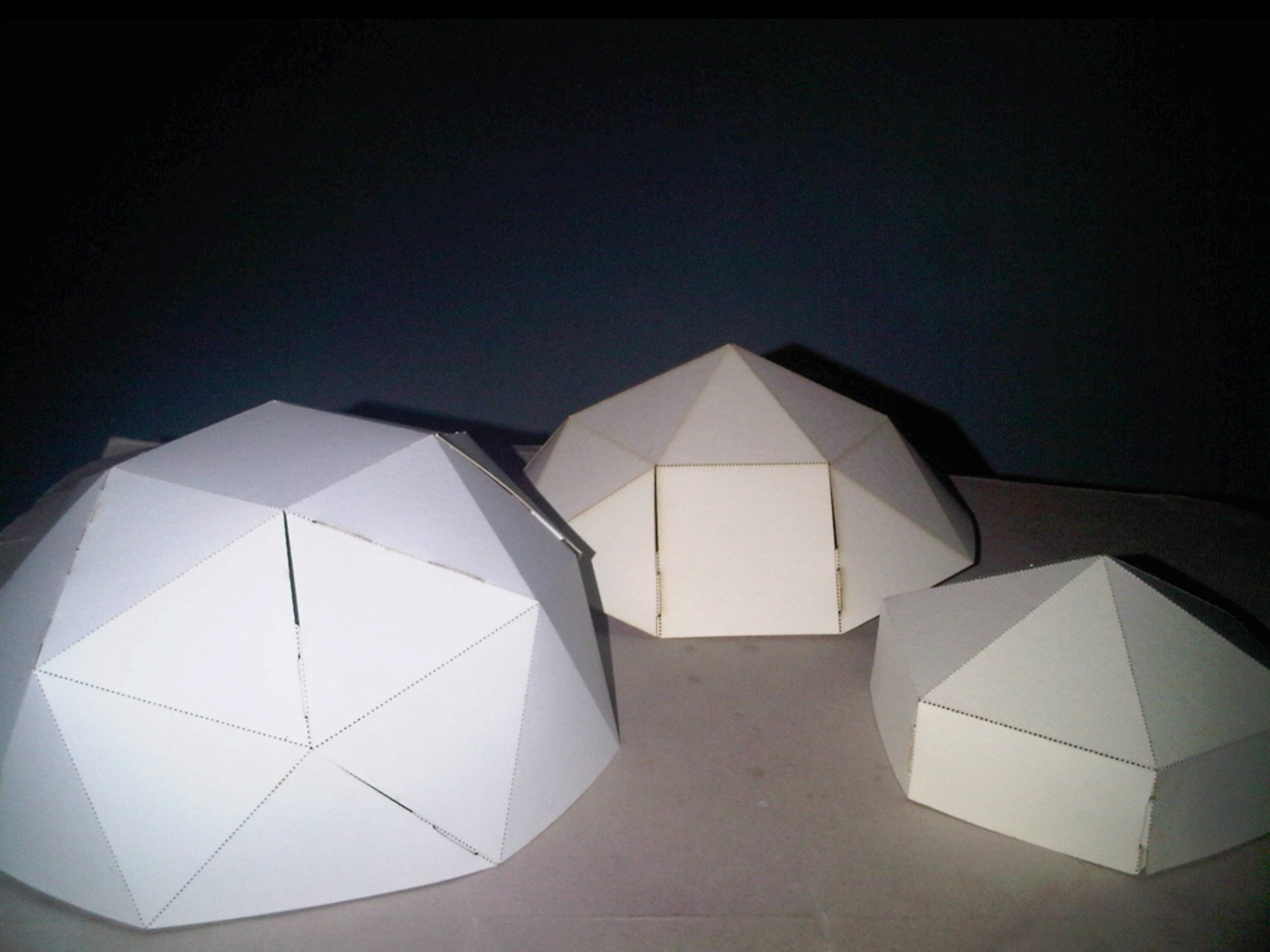


45 sq m

nearodesic domes are made from whole and half panels, just like all hexayurts

Technical aside on the nearodesic domes

- Buckminster Fuller worked from *mass* minimization, not *waste* minimization
- Edmund Harriss used concave tiling instead of Bucky's spherical trig so we get zero waste
- Using the right math has political implications - with these domes, the hippies might have won in the 1960s :)



We now have a family

- 3.5 sq m through to 45 sq m
- all with zero waste from 1.2m x 2.4m panels
- there are a few other cute tricks of joining units together and subdividing them (write me)
- it’s likely these shapes will be very common in time

Configuration

- **Geometry**
  - *what hexayurts exist?*
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What 1.2x2.4m panels have worked so far?

- polyiso insulation panels
- thermax HD tough insulation panels
- plywood (see “Hexayurt for Haiti?” doc)
- oriented strand board (osb)
- cardboard / carton
- paper honeycomb / hexacomb
- corrugated plastic / coroplast

Connectors

- the infamous “hexayurt tape” on polyiso
  - 15 cm wide, 400 kg break, 11 eur / 50m
  - clones of 3M 8959
- wooden blocks on ply and osb
- metal roof flashing with holes on plywood
- duct tape on coroplast

Horizons

- composite panels
- sandwich panels
- metal honeycombs
- structural insulated panels
- ferrocement / spray concrete / shotcrete / grancrete over polyiso insulation boards
- printing designs on coroplast
- nearly all flat materials come in this size!

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Construction ways

- polyiso/tape has at least three variations
  - build-in-place (oldest, strongest)
  - folding units with cut angles (neat, slow)
  - folding units with hinges (works)
- one or two components
  - roof and wall as one unit or two?
- video tricks for dust management in deserts

The Folding Hexayurt

Hexayurt Project





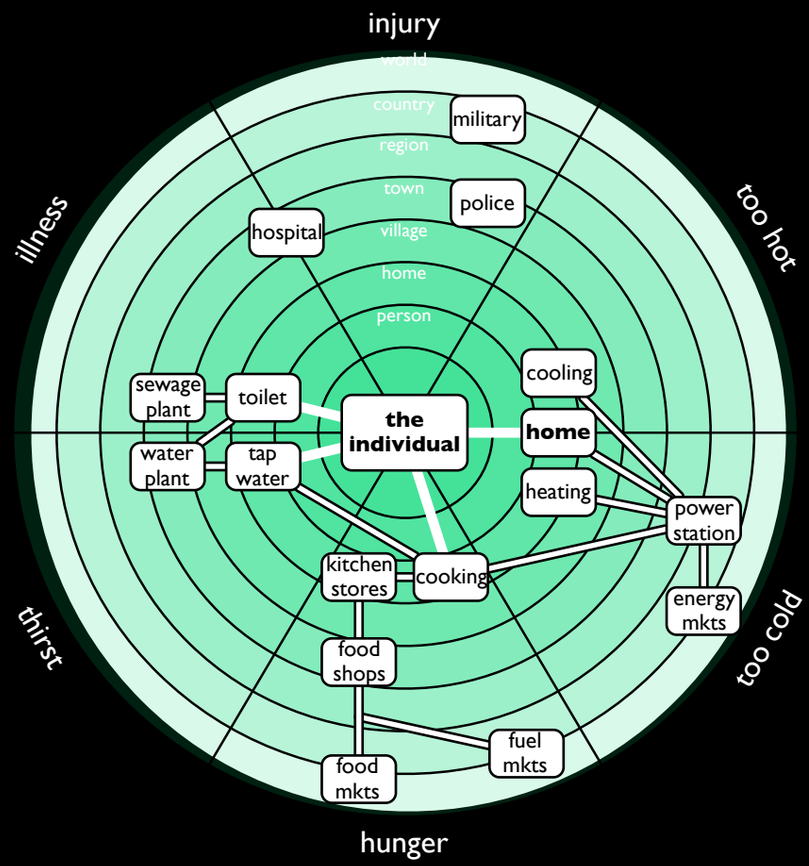

The same mechanism can be used with full sized hexayurts.

Horizons

- factory production of watertight, connectable building panels - velcro? zippers? extrusions?
- concrete or polymer sprays on polyiso/carton
- the key to building life in the outdoors is a metal surface - protected from UV light
- everything to do with thin shell concrete!

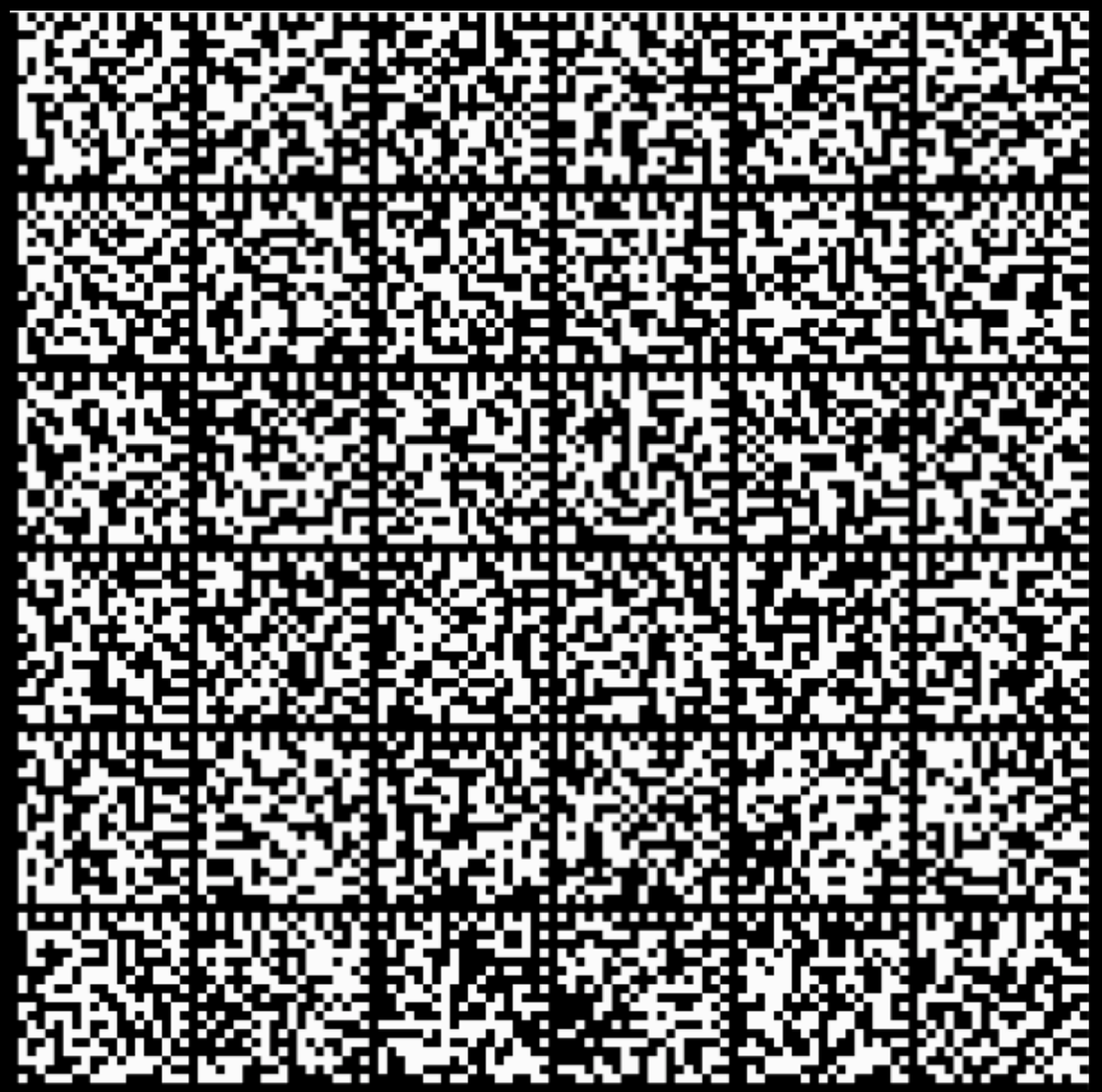
Sister Projects

CheapID

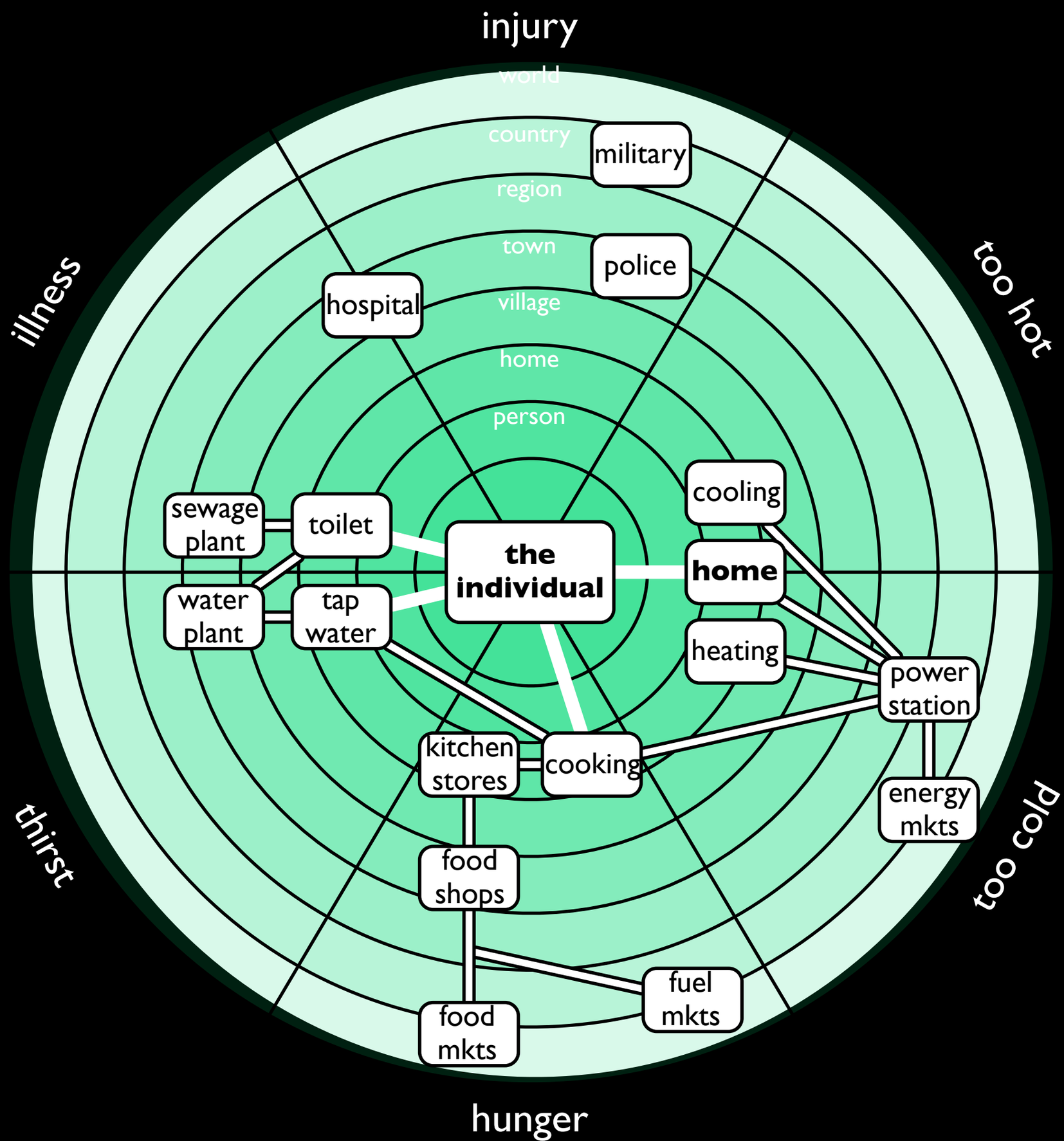


SCIM

CheapID



- 2D barcodes plus public key crypto
- anonymous wrappers for biometric ID
- designed to “wrap” biometric passports
- community controlled



- simple critical infrastructure maps
- design tool for the rest of the systems you need after housing is sorted out
- see “dealing in security”

Thank you!

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