ModelCraft: Capturing Freehand Annotations and Edits on Physical Models

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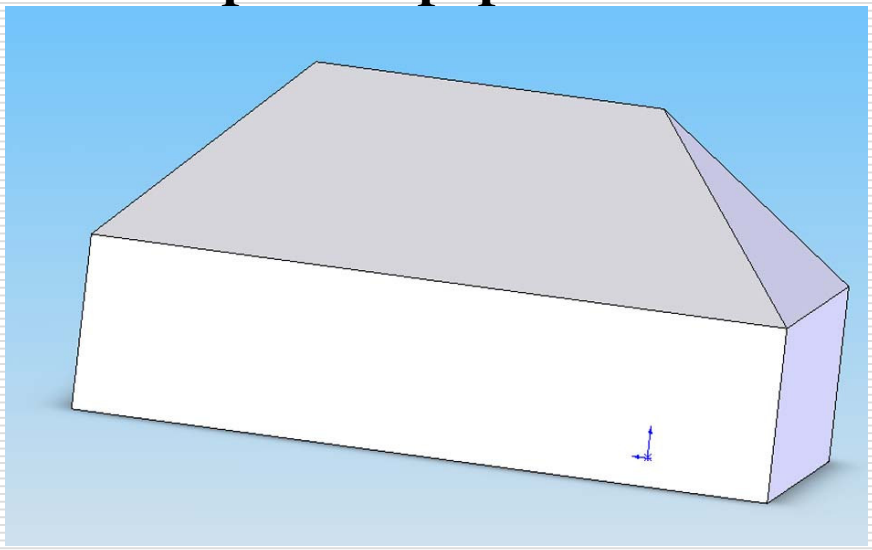
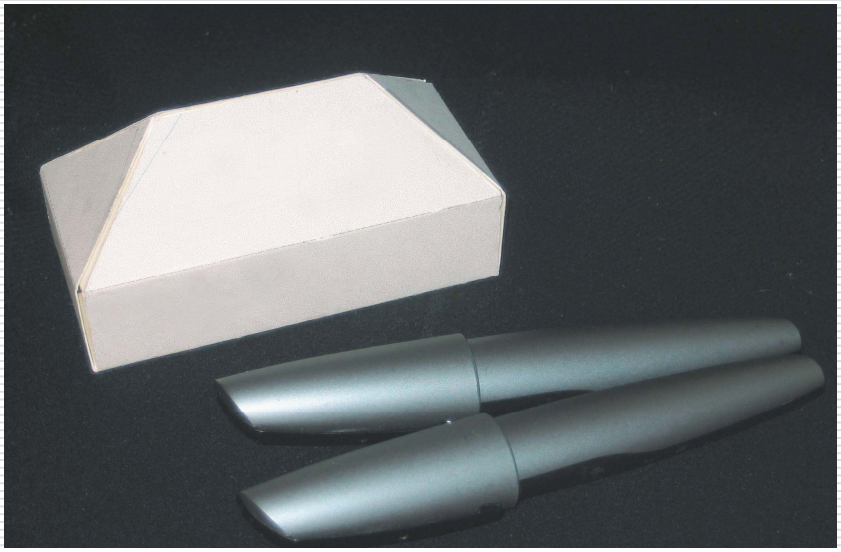
ModelCraft

Physical Model made from Anoto pattern paper



3D Cad representation



Logitech IO2 Pen

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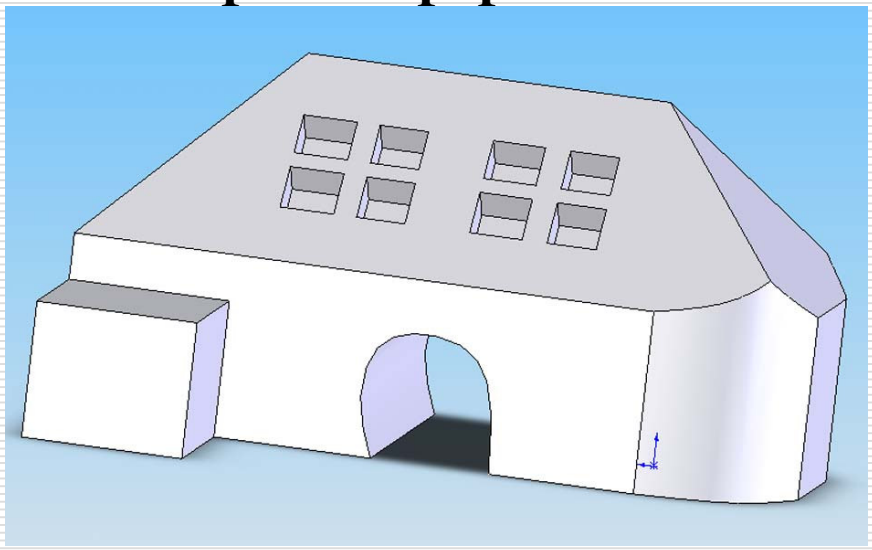

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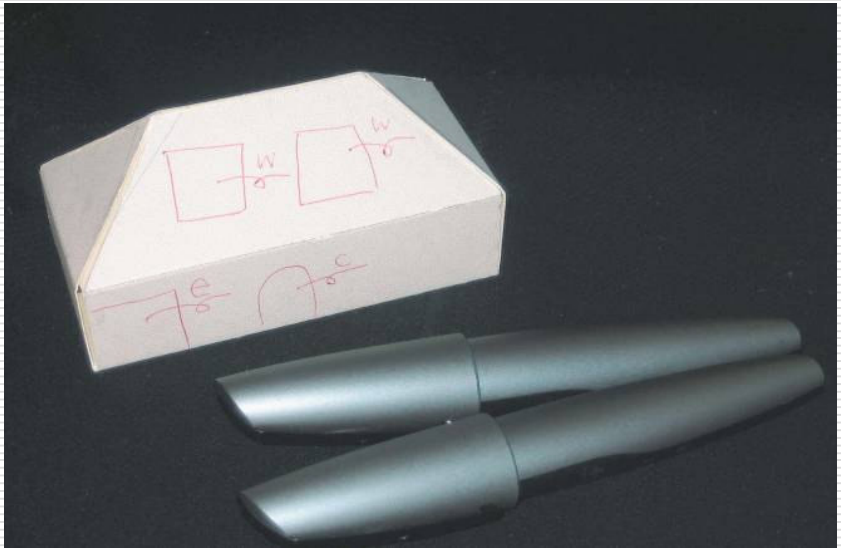

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Video

Relate Work (1)

- Tracking 3D model drawing
  - 3D Painting system [Agrawala et al, 1995]
  - Augmented Reality Technique [Grasset et al 2005]
- 3D Sketch system
  - Teddy [Igarashi, et al 1999]
  - SKETCH [Zeleznik, et al. 1996]

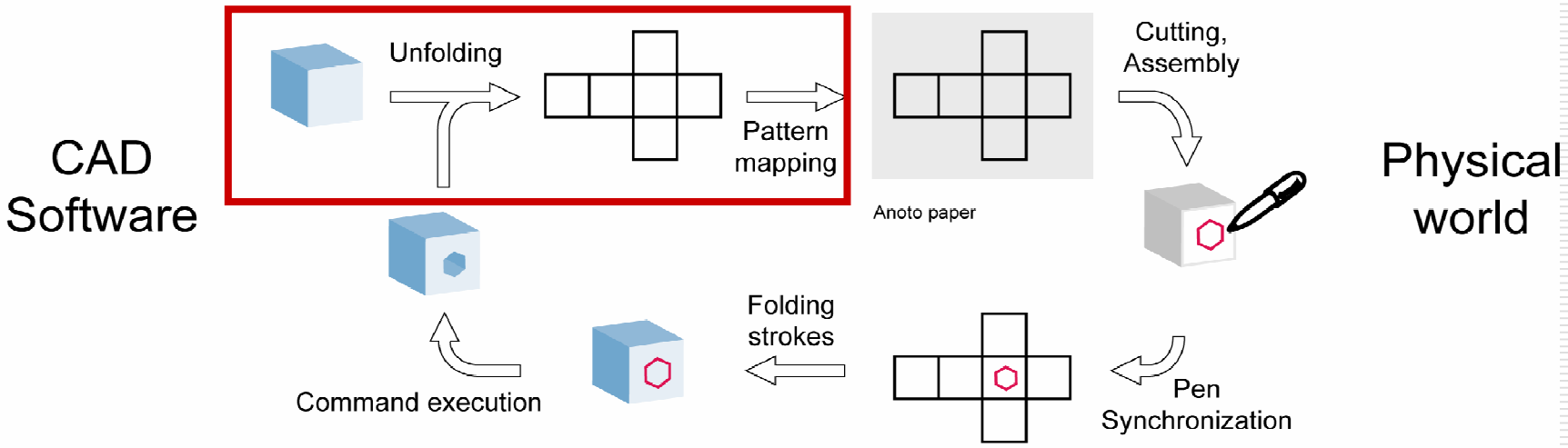
Relate Work (2)

- Tangible interface-Spatial Interaction
  - URP [Underkoffler and Ishii, 1998]
- Command Selection
  - Scriboli [Hinckley, et al.2005]
  - PapierCraft [Liao, et al.,2005]

Strength of ModelCraft

- Easy Setup
  - Inexpensive : paper and pen
  - Quick setup : simple calibration
- Scalability
  - Number of Models, Pens, …
- Portability
  - Capture information in model's reference

Life Cycle of a Model



- Unfolding
- PADD infrastructure
- Annotation & Command

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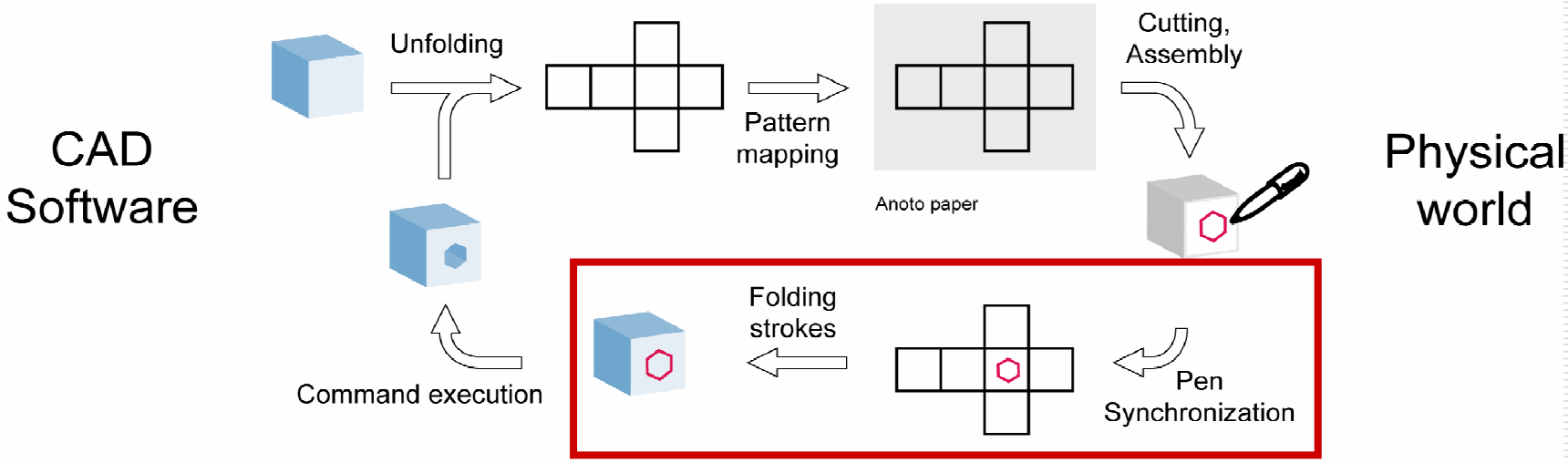
Life Cycle of a Model



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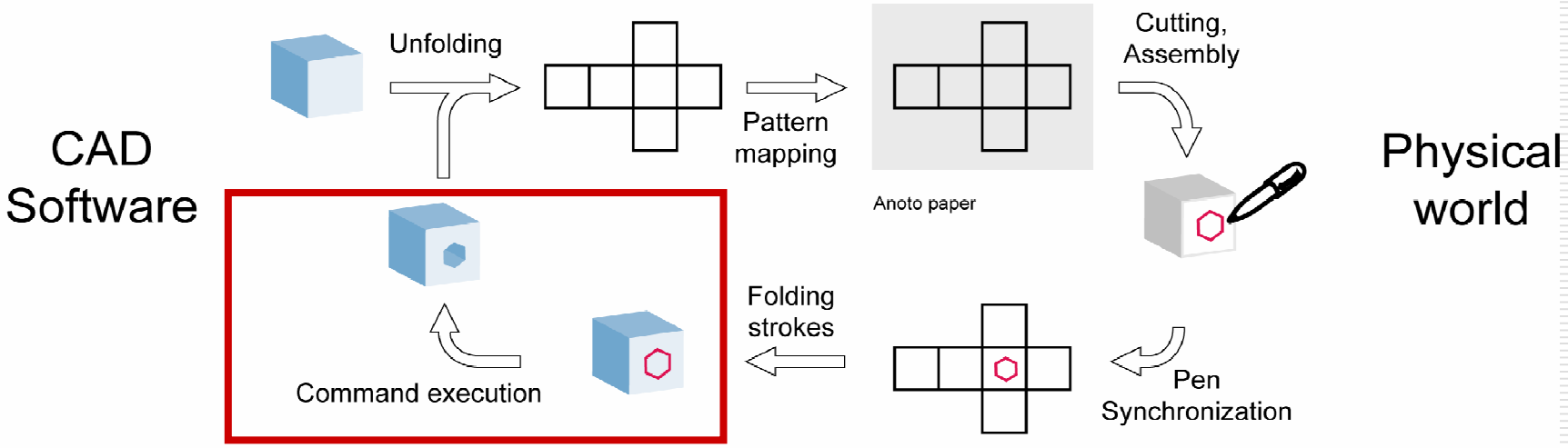
Life Cycle of a Model



- Unfolding
- PADD infrastructure
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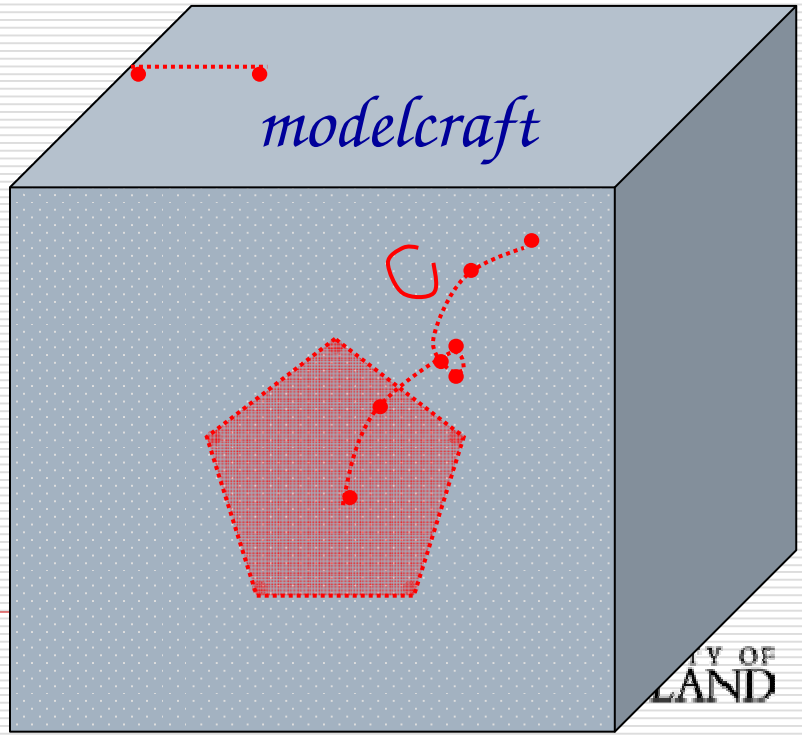
Annotation and Command

- Two types of Mode
  - Annotation : blue pen
  - Syntax based command: red pen
    - Executable sketch
    - Pigtail delimiter
    - Command letter



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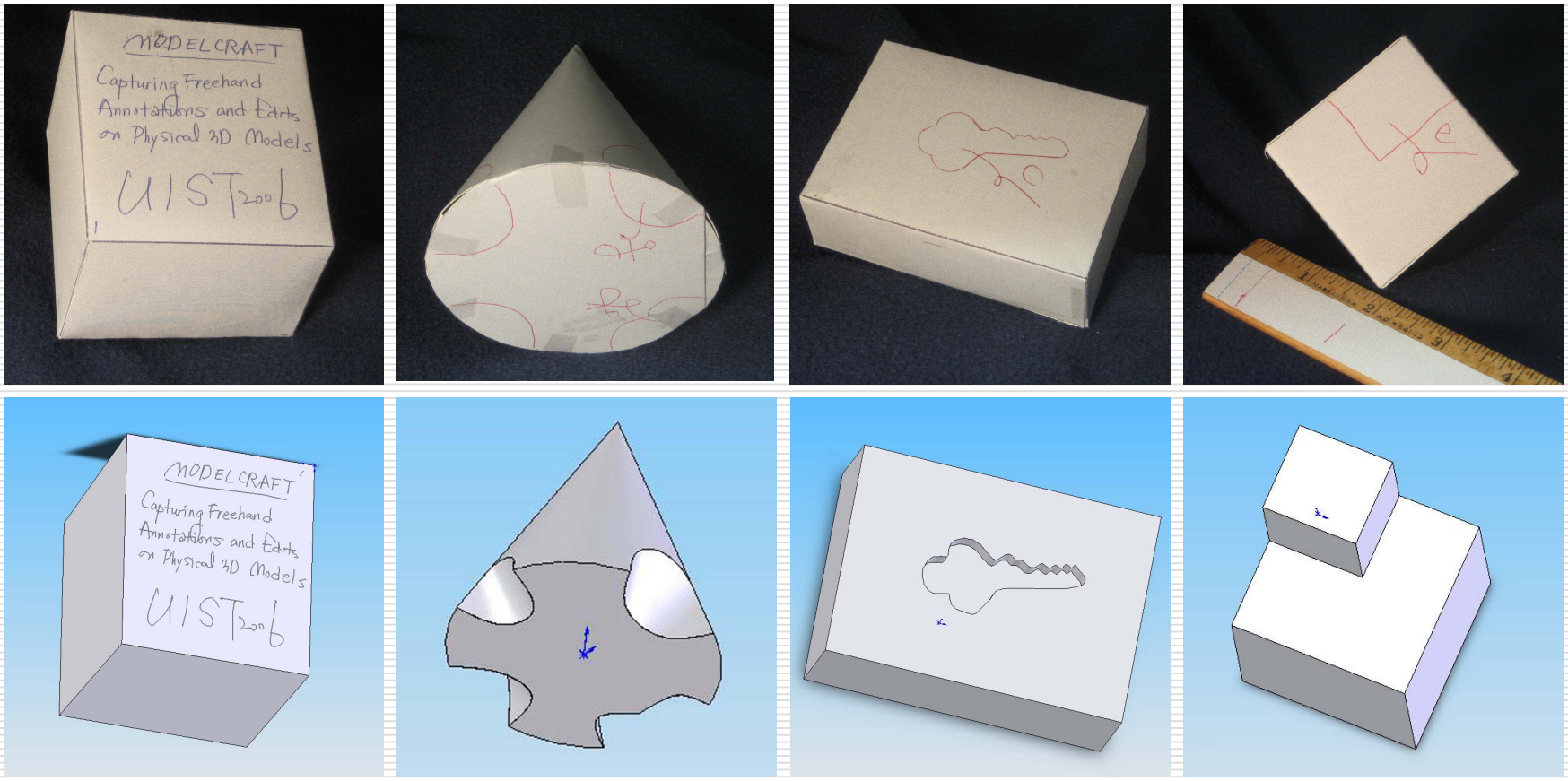
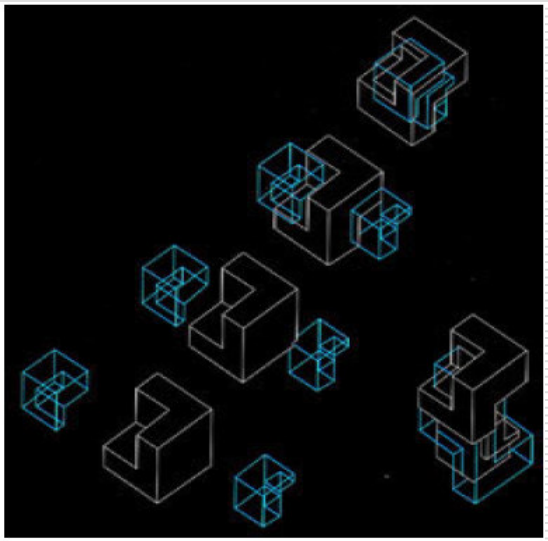
ModelCraft Result



User Feedback : Interviews (1)

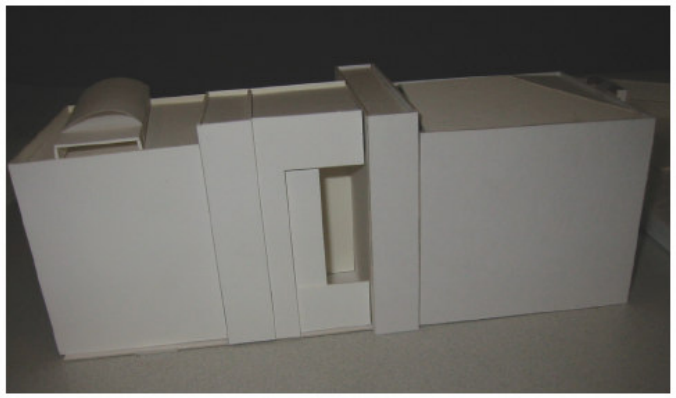
- UMD Architecture Professor
  - Pros
    - Easy syntax based command language
    - Developing 3D thinking
  - Cons
    - Pen tracking problem



Peter Elsenman, House 11a, 1999

User Feedback : Interviews (2)

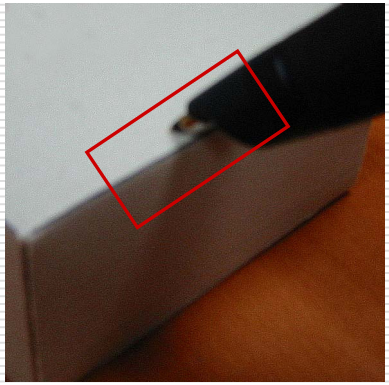
- BeeryRio, DMJM : Two user group
  - Design Perspective
    - Prototyping, Massing
  - CAD Perspective
    - High level of details
    - Finalization stage



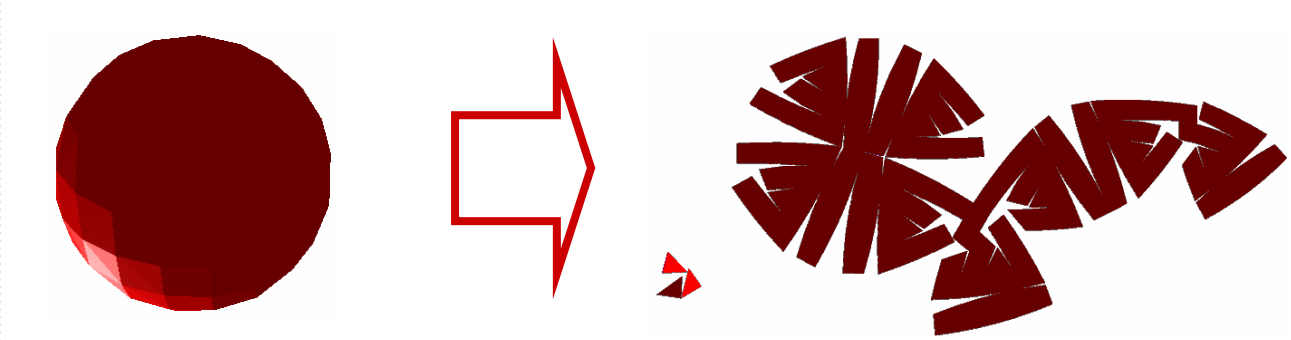
Rosana Keleher, BeeryRio, 2005

Limitations

- Tracking Performance
- Freespace Interaction
- Limited Feedback
- Unfolding Process



Distorted Field of View



Future Work – Technique (1)

- Larger objects with various topology
- Other rapid prototyping process
- Complex Surface

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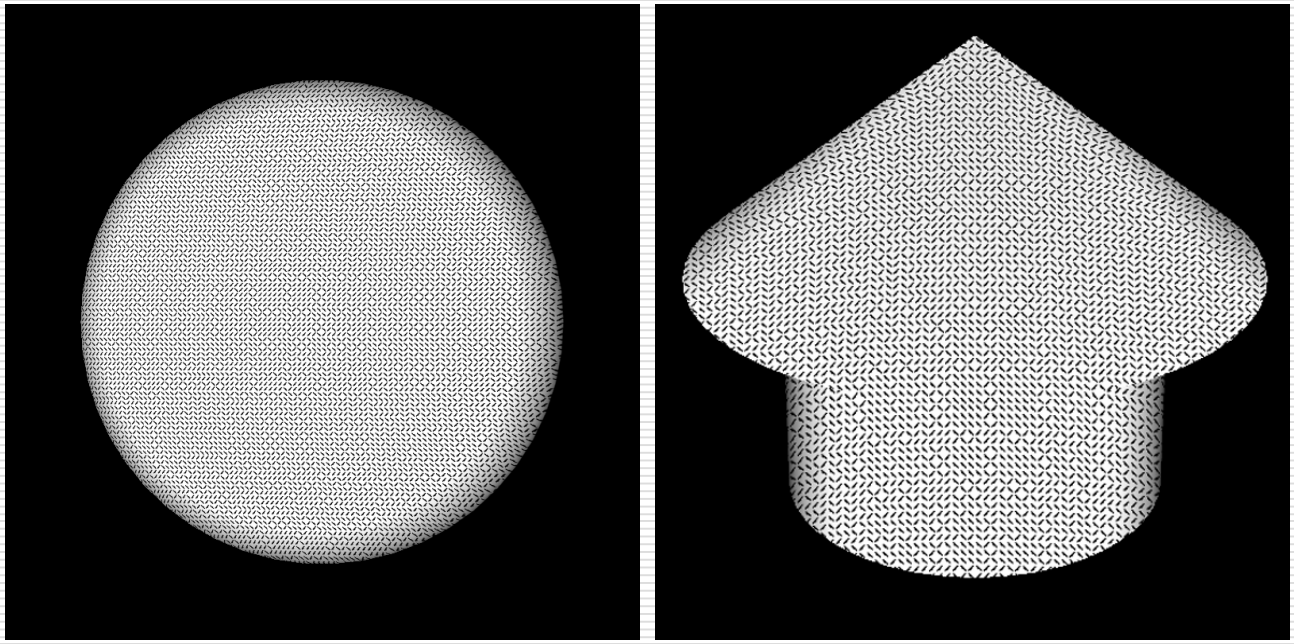
Future Work – Technique (2)

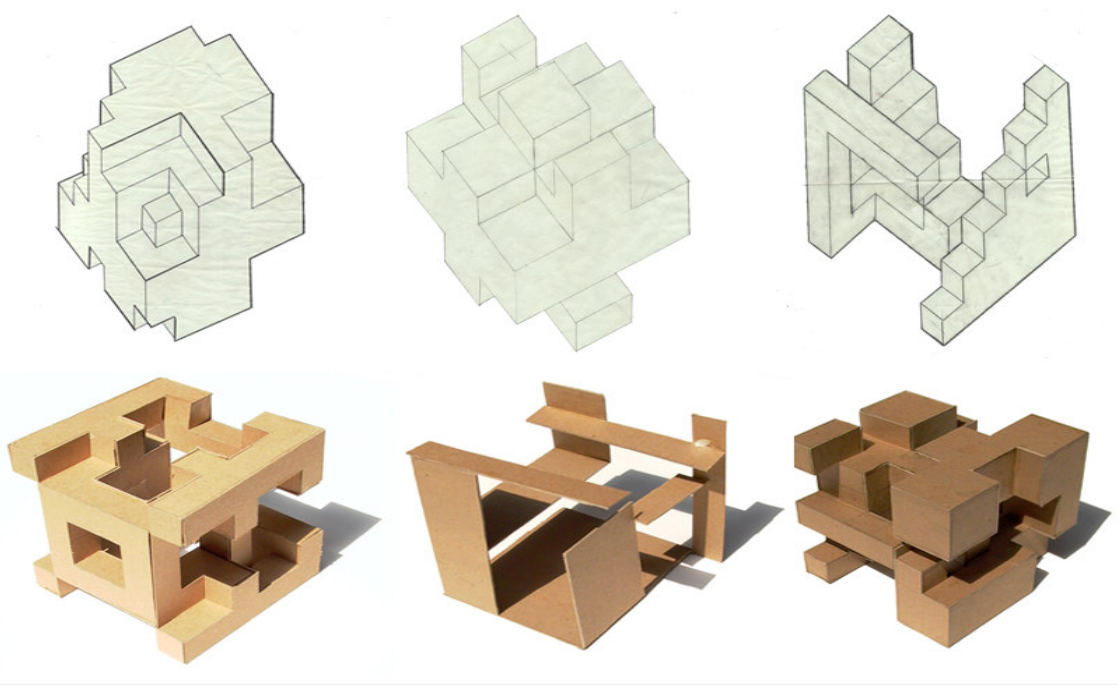
- Better tracking technology



Dataglyph in structured light Chen, Jin-dong, PARC

Future Work - User Study

- Cube project



K.C Zellars, Cohen, Deutsch et al

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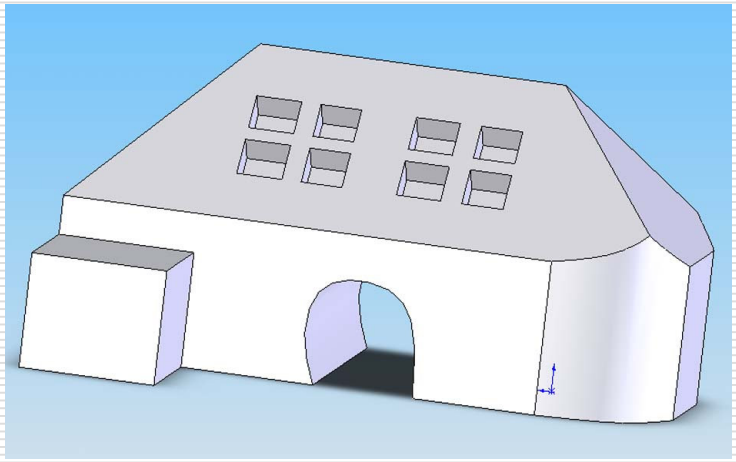
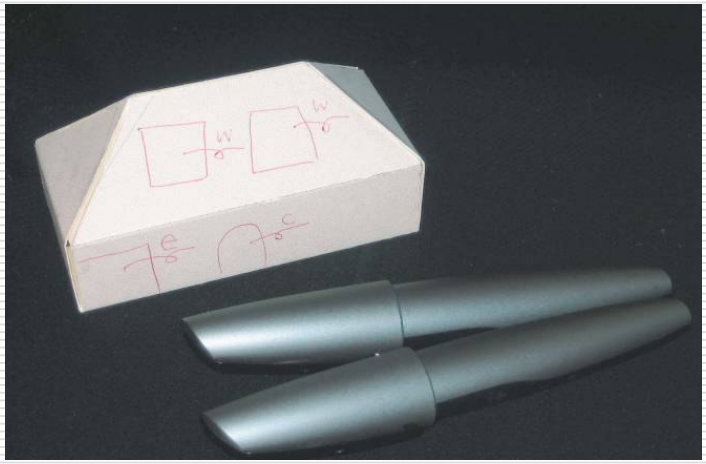
Summary

- ModelCraft
  - 3D Annotation capture system





- Positive preliminary feedback

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