SpikeNav: Using Stylus Tilt in 3D Navigation

Robert Bridson — University of British Columbia / Exotic Matter AB

http://www.cs.ubc.ca/~rbridson/spikenav

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**Motivation**
Designing and debugging 3D visual effects (smoke surface shown here) needs good 3D navigation:
- easily view from all angles
- fluidly track over surfaces
- quickly zoom in and out

Hardware: 3D artists often already have a tablet/stylus that provides **tilt** and **pressure** channels that are ignored for most tasks — let’s exploit them!

**Spike Metaphor**
When stylus clicks on model, becomes a virtual **spike**: provides a handle for direct manipulation

**Camera Model**
5D camera: 3D translation, 2D rotation
- preserves “up”
- makes rotation commutative
- industry standard in Autodesk Maya

**Translating**
Map stylus movement to translation in camera plane.
3D anchor remains under cursor; depth remains constant.

**Rotating**
Directly map 2D tilt to 2D rotation
Probably need acceleration to avoid excessive clutching (limited tilt range)

**Dollying**
Pressure is used to trigger mode switch: rotate vs. dolly
Map one tilt axis to dollying: uses **lever** metaphor

Exponential mapping makes the most of tilt range.

Public domain source code available