

THE VEOS -- SLIDE BULLETS

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May 1990

Interface vs. Inclusion

- symbolic transparency
- experiential
- total redefinition
 - new i/o
 - new interaction model
 - new interaction skills
 - new symbolic model

Assume

- sufficient rendering power
- sufficient computational power
- refined i/o
- parallelism
- known physical modeling algorithms

Essentials

- headmount, headtracking
- 3D dynamic, interactive model
- voice recognition
- wand/glove

Bottlenecks

- new headmount technology
- collision detection/boundary maintenance
- human factors
- long-term experience
- tactile feedback
- funding

Ready to go

- 3D sound
- 3D modeling
- physical modeling (with sufficient computational power)
- adaptive refinement in rendering

Short-term developments

- dynamic modeling
- interactive construction
- hierarchical decomposition/abstraction
- contradiction maintenance
- object parallelism and persistence
- incremental updating, predictive algorithms, display sampling

Tools

- multiple technique 3D modeling
- constraint management
- object inference
- history and statistics

World construction

- incremental dynamics
- viewpoint
- boundaries
- physical properties
- multiple patrons
- varieties of space

Space

- varieties
 - indicative topology
 - nominal categories
 - ordinal rankings
 - interval countings
 - rational comparisons
 - real geometries
 - imaginary waveforms

properties
consistency
continuity
linearity
vector flow
opaqueness
granularity

Object construction

composability
properties
classes

Abstract worlds

database navigation
(visual semantics)
visual mathematics

Languages

knowledge base, database
rulebase
equations, constraints
dynamics

Connectivity networks

structural	isaPart
spatial..	isAdjoining
procedural	isAfter
functional	isaParameter
informative	isaMessage
abstract..	isaParent

Entities

reactive
responsive
deductive
coordinated
autonomous

Wand

- 3D cursor/jack
- 3D lasso/cube
 - connect with lines
 - point skewer
 - edge align
 - face grab
- object
 - identify, connect, grasp, normalize
- perspective
 - sight, move, jack
- construction d
 - raw, paint, slice
- distance measure

Virtual body

- inhabit object, jack perspective
- perspective reference
- direct interaction
- behavior measurement
- inclusion and coherence

Viewpoint tools

- fly through
- scale
- jack-in, teleport
- multiple concurrent views
- project and editing
- backdrops and foredrops

Solid modeling

- spatial enumeration
- primitive form assembly
- sweeps and generalized cylinders
- constructive solid geometry
- boundary models
- topological models

Disposition rulebase

invariants
memberships
behavioral rules
priorities
metarules

Relationships

composition	isaPart
connectivity	isinCommunication
constraints	isLimited
vocabulary	

Space editor

organization
 metrics
 structure
 origins
 indexing and coordinates
decompositions, subspaces
 fields
 forces
 turbulence
 discontinuity
constraints
 laws and their parameters
 filters

Abstraction editor

- languages
 - naming, reference
 - syntax
 - command sets
- categories
 - abstract data types
 - hierarchical compositions
 - networks and lattices
- structures
 - axiom sets, transformation rules
 - domains
 - functions
 - relations
 - equations
- semantics
 - recognize and substitute
 - sensor/effector mapping

Boundary tools

- collision detection
 - solidity
 - contact maintenance
 - surface and edge travel
- spatial extent
 - bounding boxes
 - field of influence
- connectivity
- self-maintenance

Form abstraction

- abstract/algebraic properties
- world and object decomposition
- fractal/recursive structure

Multiple concurrent patrons

- uniqueness
- initialization of common world aspects
- negotiation of common aspects
- consistency maintenance
- contradiction maintenance and partitioning

History and Statistics

- experience storage
 - categorical
 - ordinal, time-stamped
- knowledge base
- experience compilation
- clustering and classification
- generalization
- experience analyzation
- distribution statistics
- correlational analysis
- trend analysis

Resource management

- display
 - parameterized animation speeds
 - adaptive refinement
 - successive abstraction
 - distance and interaction filters
- processing
 - dynamic load balancing
 - critical processes
 - tasks and threads
- time
 - instant replay
 - time-tagged communication
 - variable rate parallel clocks
 - time bundling and quantization