# Fine-Grained 6-DOF Localization from Known Structure

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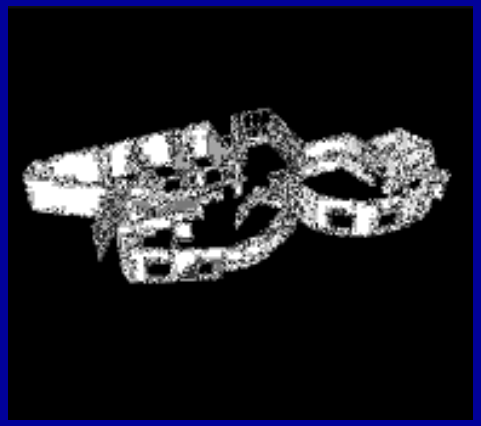
# Problem Statement: vision-based localization in 3D

Rough 3D Model

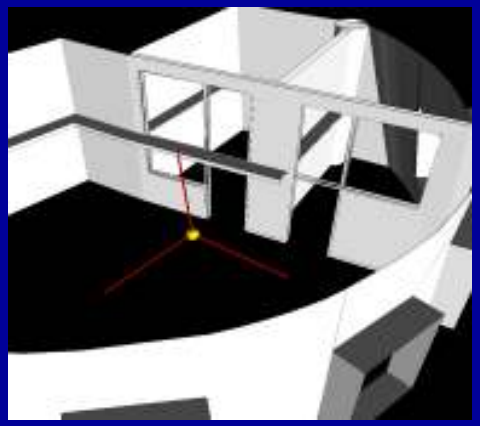


Omnivision Video Sequence

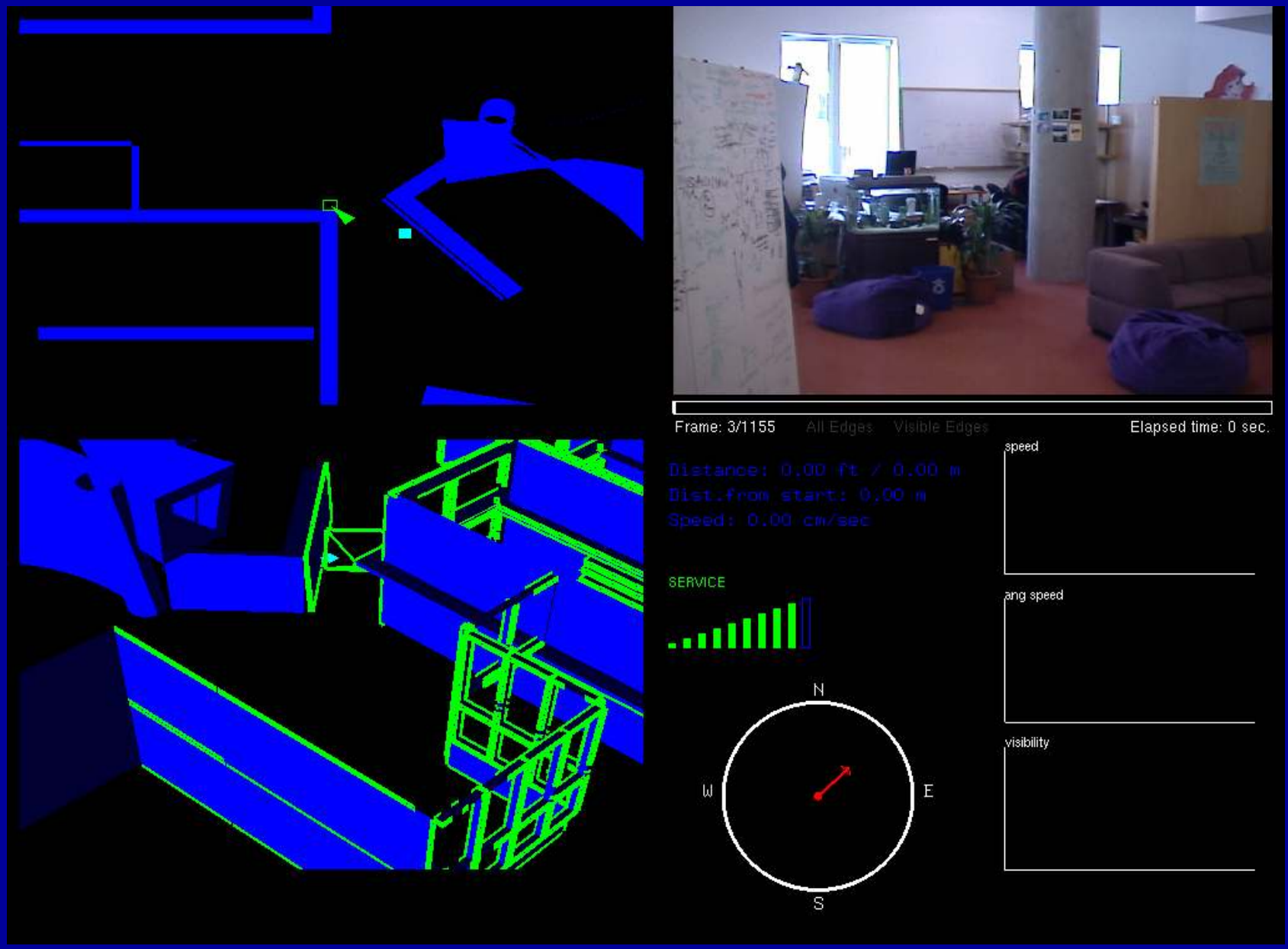
INPUT

- real-time
- long-run (sev. hours)
- wide-area

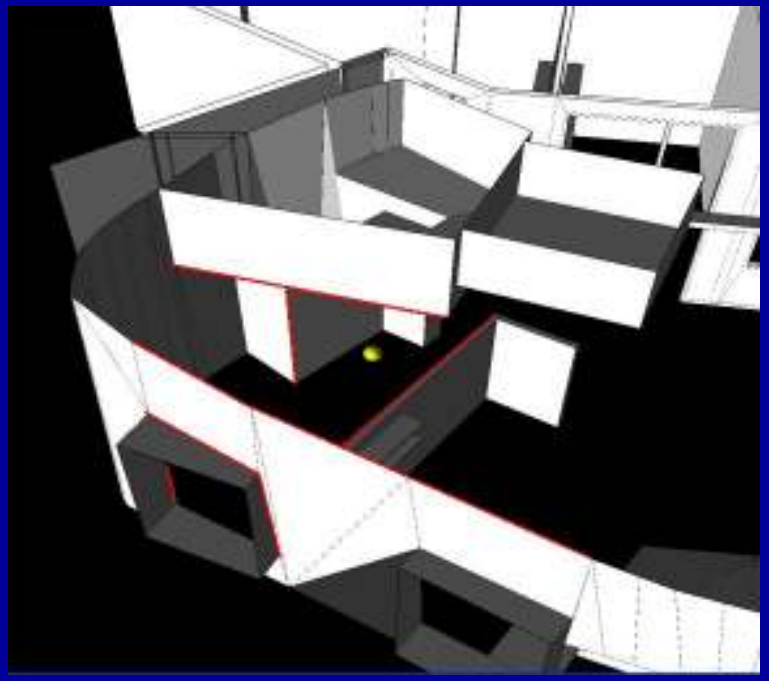
Global Camera Position and Orientation

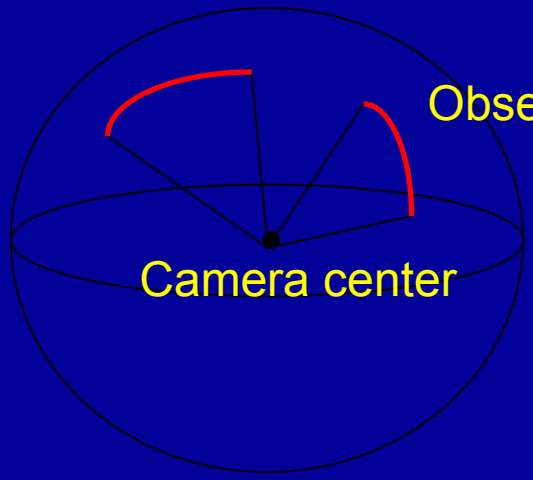


OUTPUT


Frame: 3/1155
All Edges
Visible Edges
Elapsed time: 0 sec.
Distance: 0.00 ft / 0.00 m
Dist.from start: 0.00 m
Speed: 0.00 cm/sec
SERVICE
N
W
E
S
speed
ang speed
visibility

# Our approach: line-based correspondence



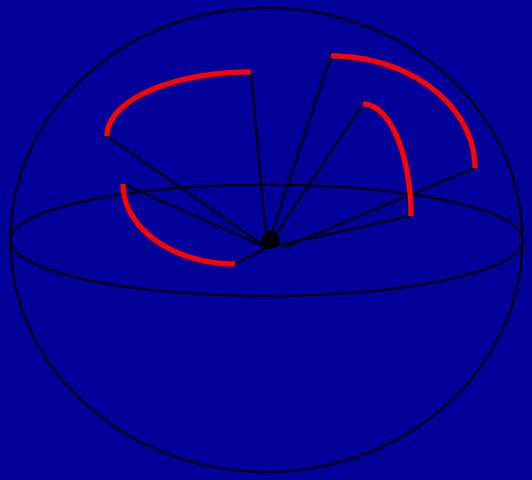


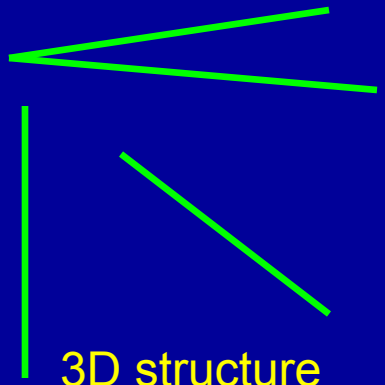

- maintain correspondence btwn 2D edges and 3D lines
- compute camera pose from correspondence (min problem)

- offline: precompute set of visible 3D lines from given locations.

# Quick note on the initialization problem

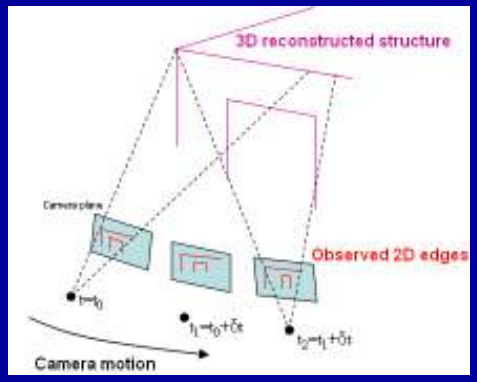
Option 1: one-shot initialization






- **quick test : is this a possible correspondence?**
- **If Yes, compute the camera pose**
- **Analyze the rest of the 3D structure**

Option 2: short-sequence Structure-From-Motion




- **reconstruct 3D model from several camera positions**
- **align this model with the global structure**