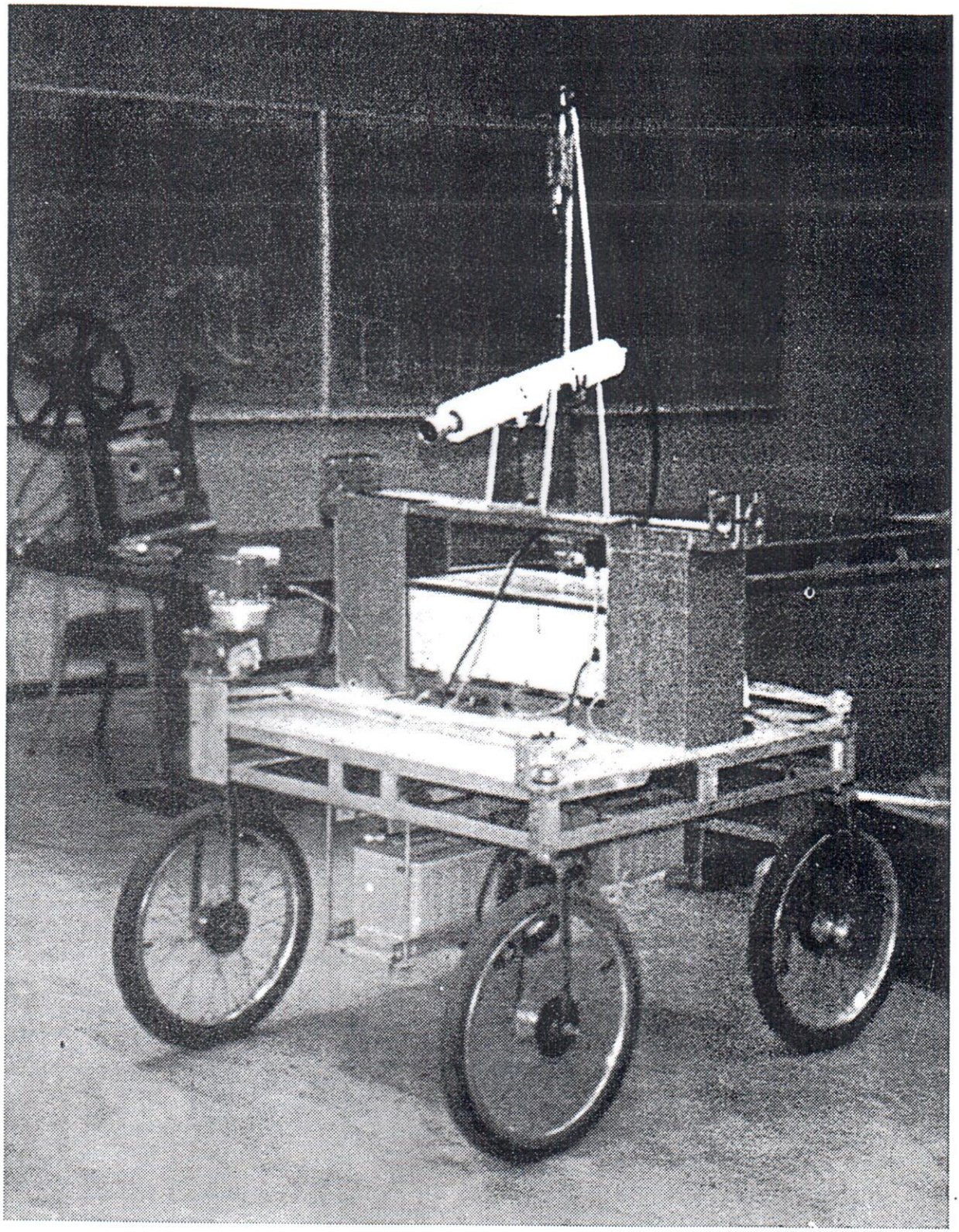
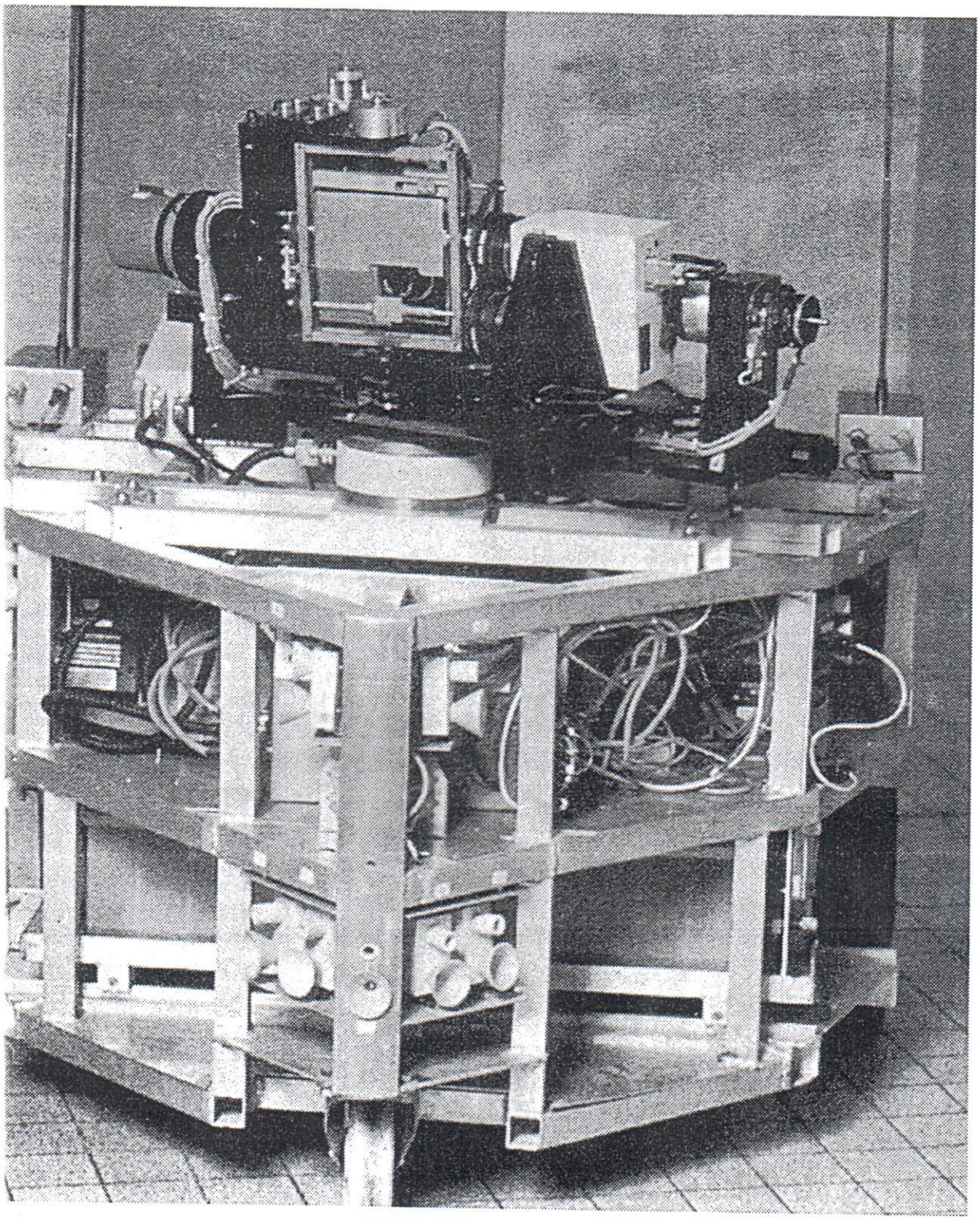


(A)

Figure 1.9



ure 1.8

LARE. (Photograph courtesy of LAAS-CNRS, Toulouse, France.)

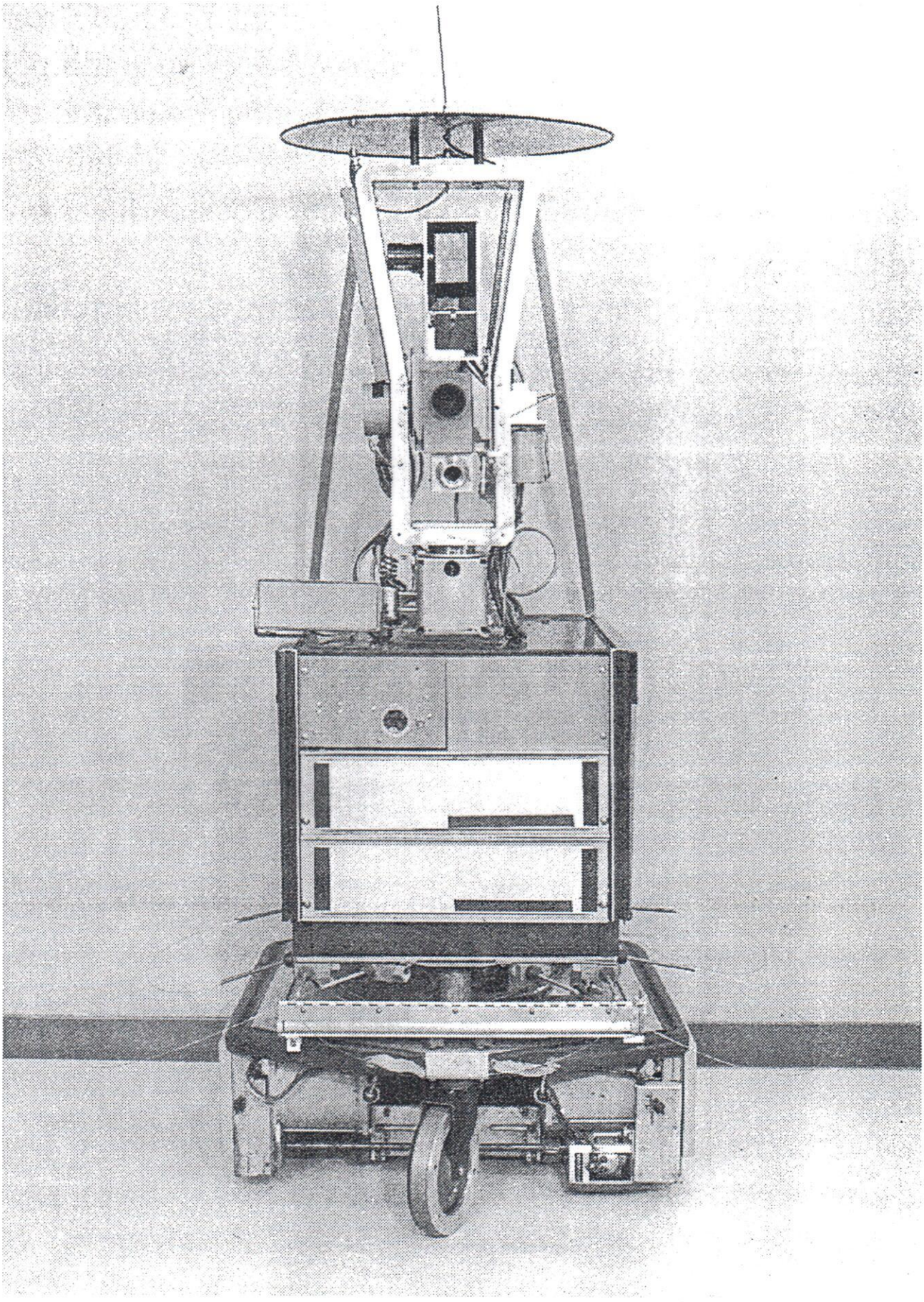
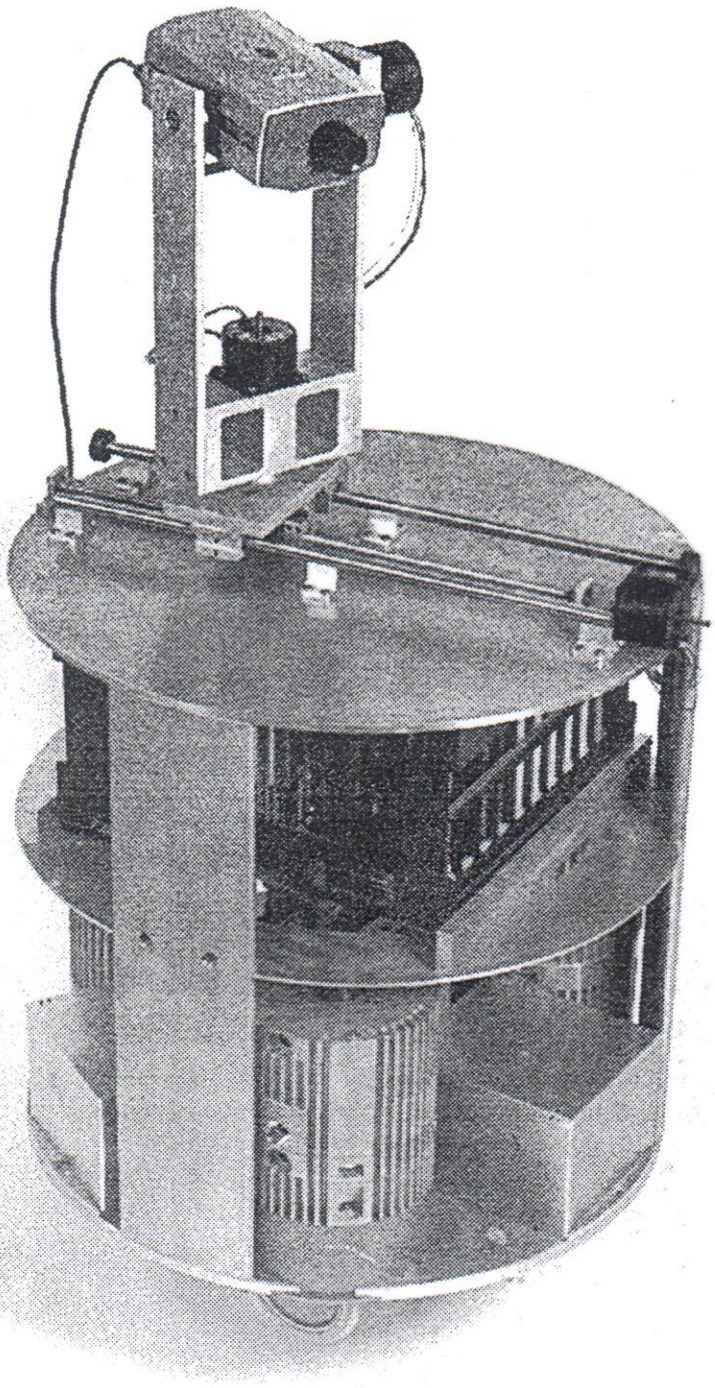


Figure 1.7
Shakey. (Photograph courtesy of SRI International.)

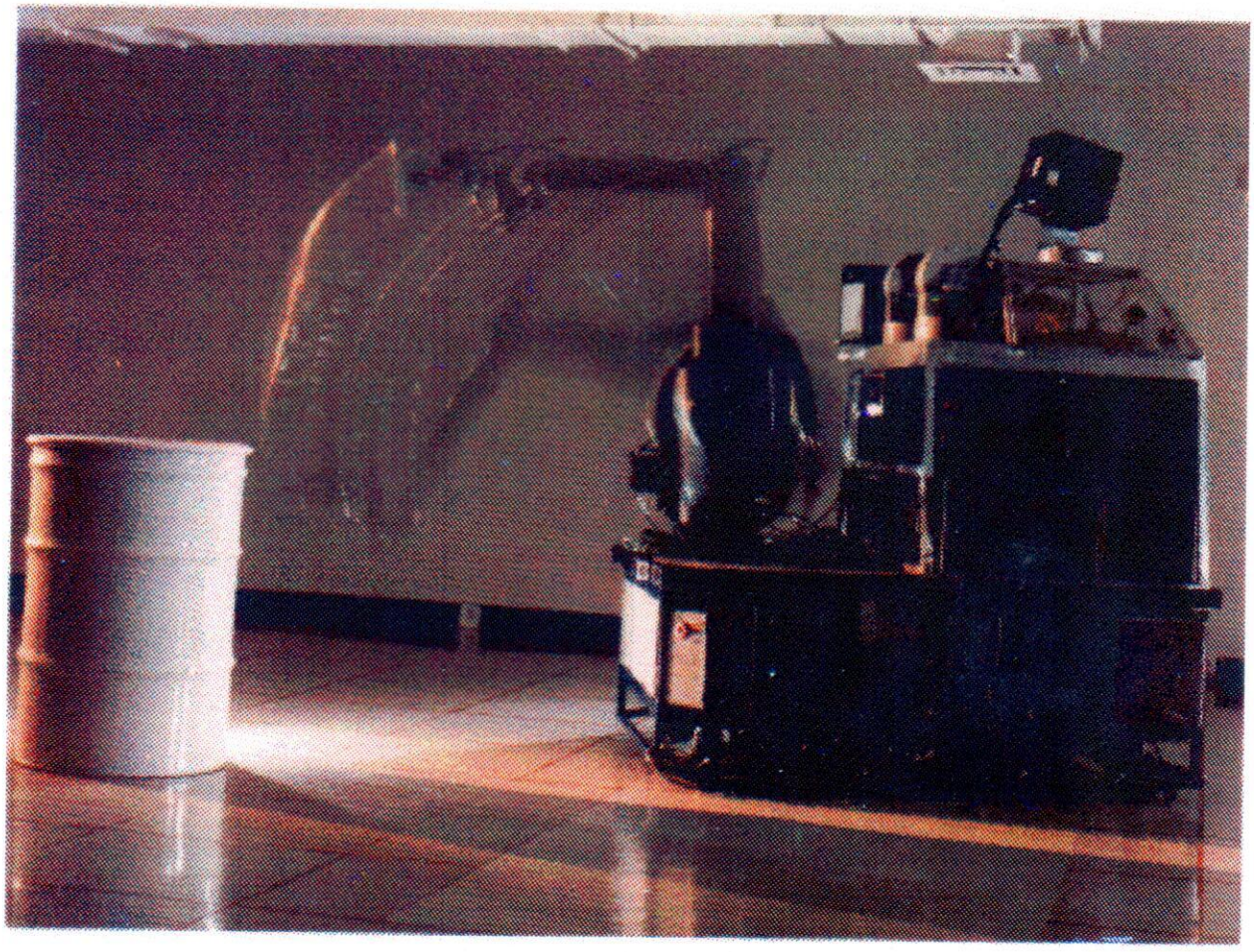


:)

gure 1.9 ***(continued)***

.) Stanford Cart. (B) CMU Rover. (Photographs courtesy of Hans Morav
)botics Institute, Carnegie-Mellon University.)

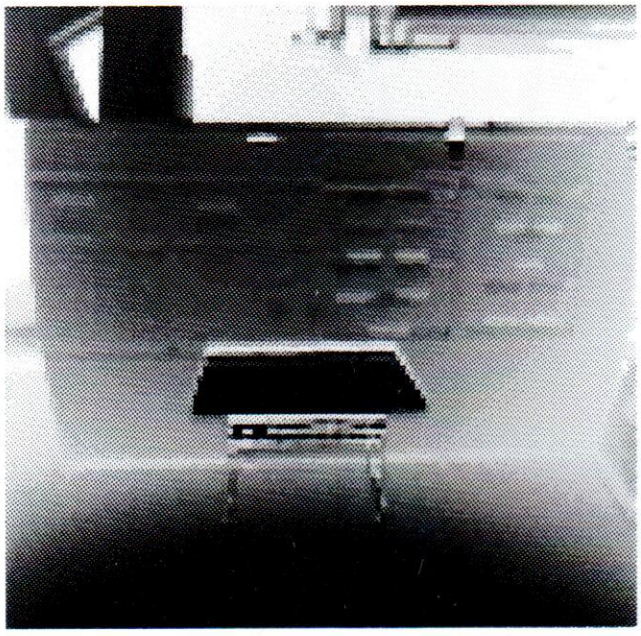
The **REAL** robot



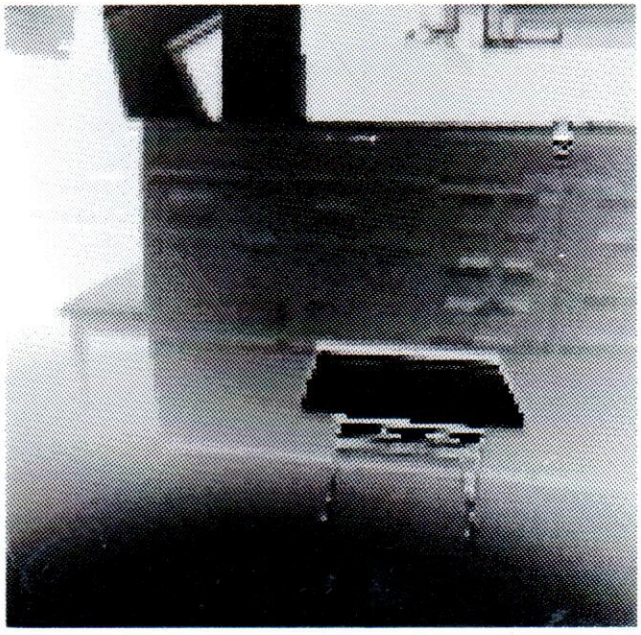
Hermies-III robot at Oak Ridge National Lab

- Scale: 2 meters in height
- LRF mounted at "cyclops" position

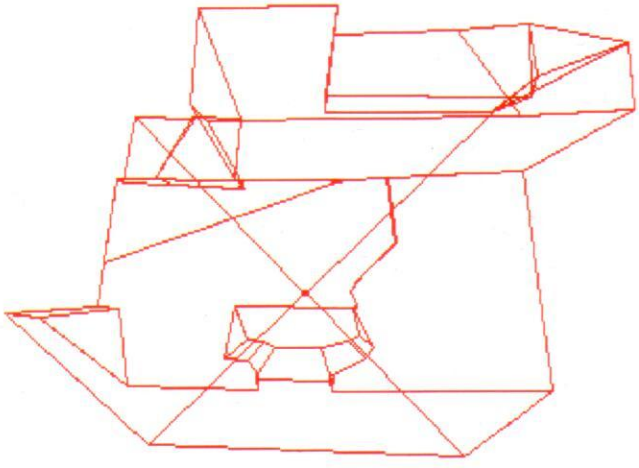
Application:
Indoor Mobile Robot Navigation



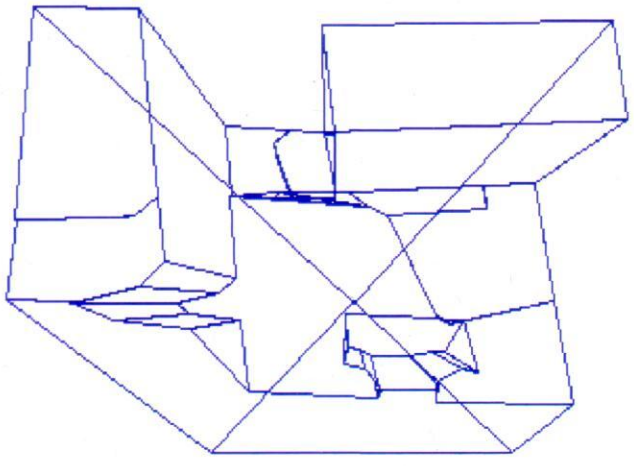
range image #1



range image #2

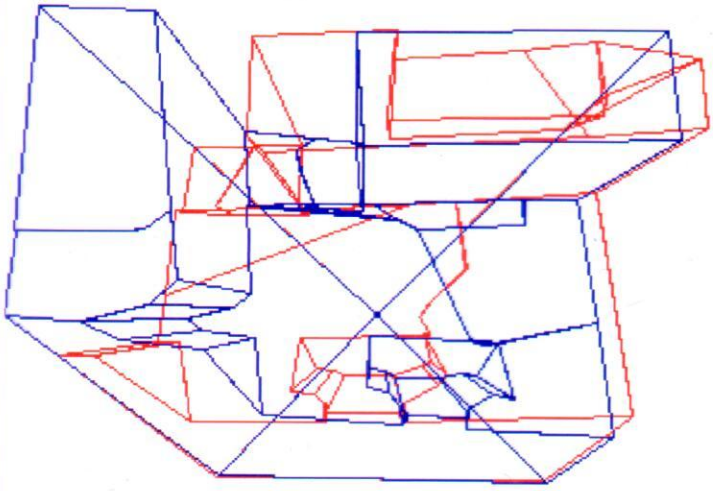


space envelope #1

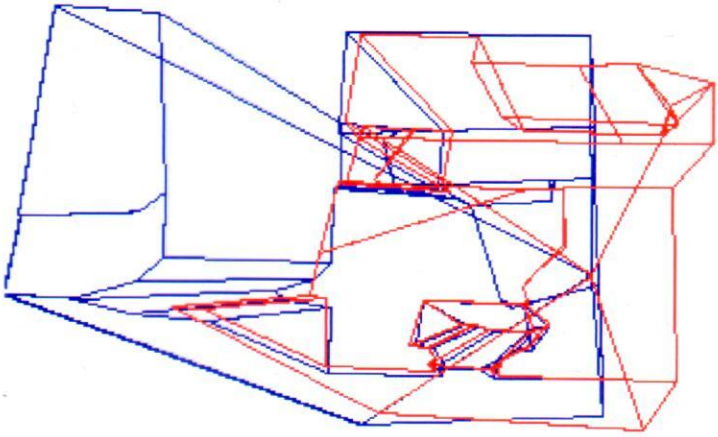


space envelope #2

How did robot move between views?

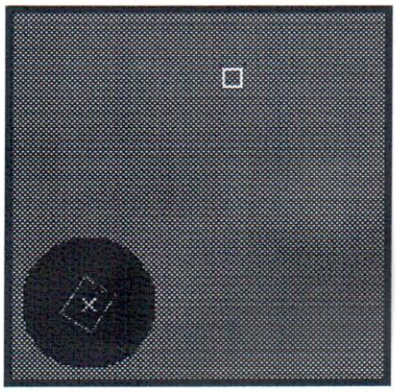


before alignment

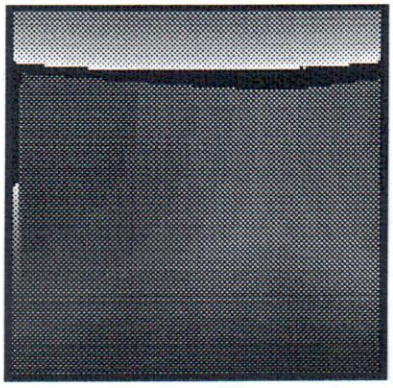


aligned by motion estimate

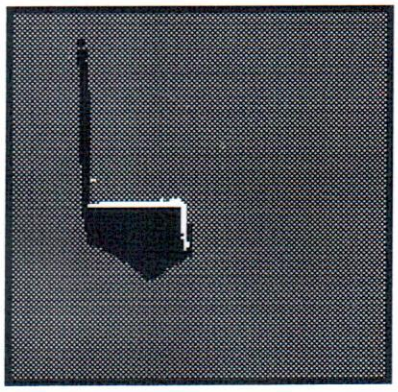
Computer Vision Example



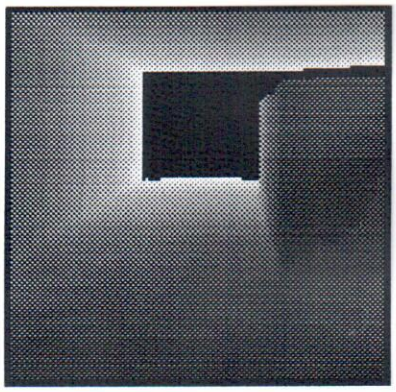
(a) Initial knowledge



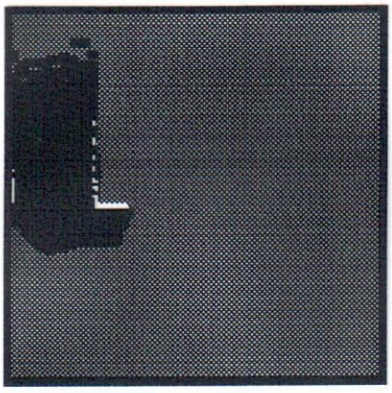
(b) Range image



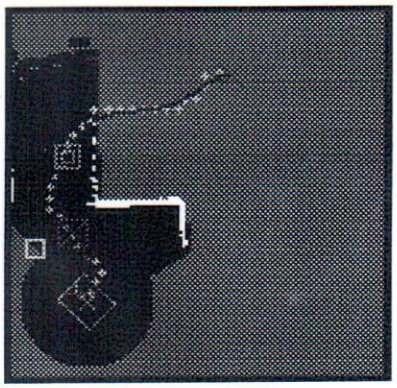
(c) Floormap from (b)



(d) Second range image



(e) Floormap from (d)



(f) Combined floormap

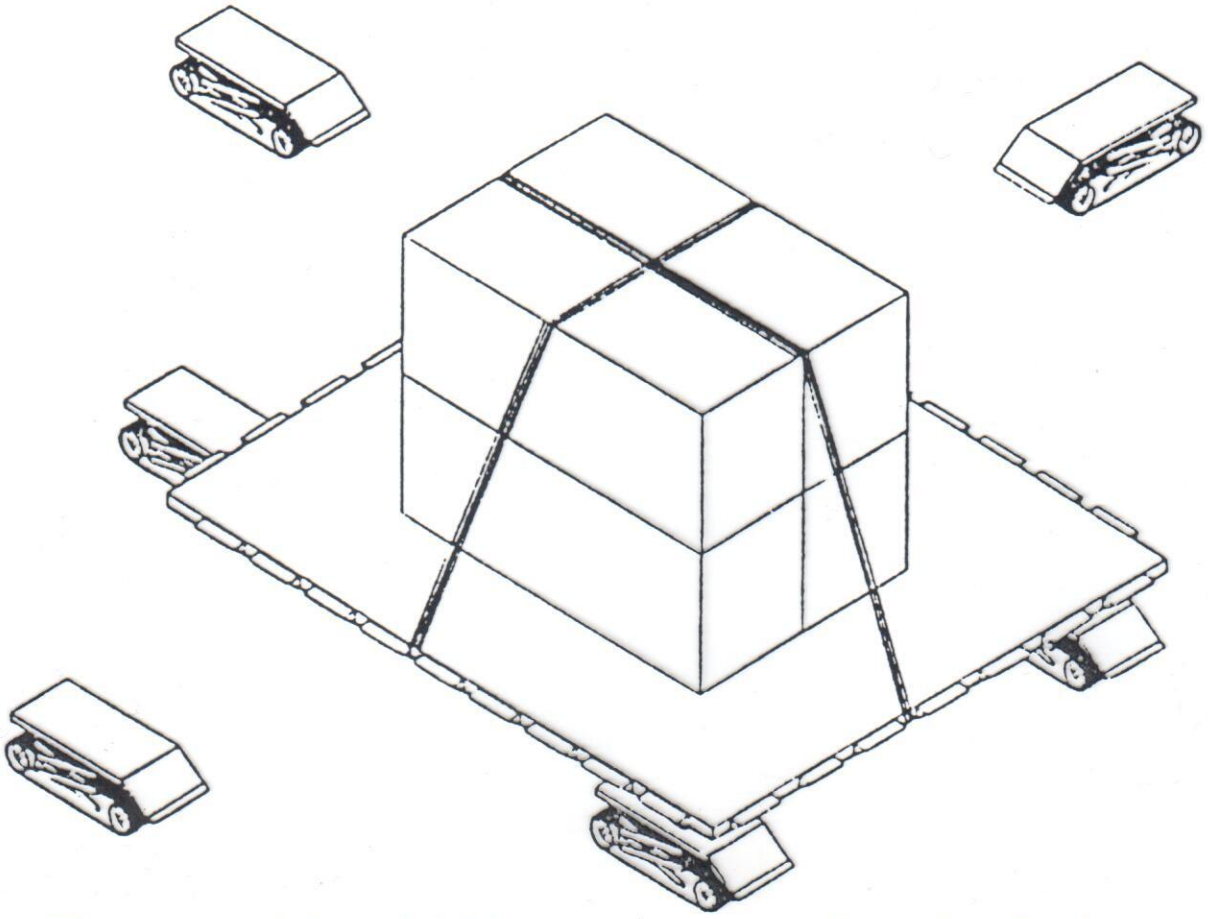


Figure 1. Material Transport using Ant-like Robots

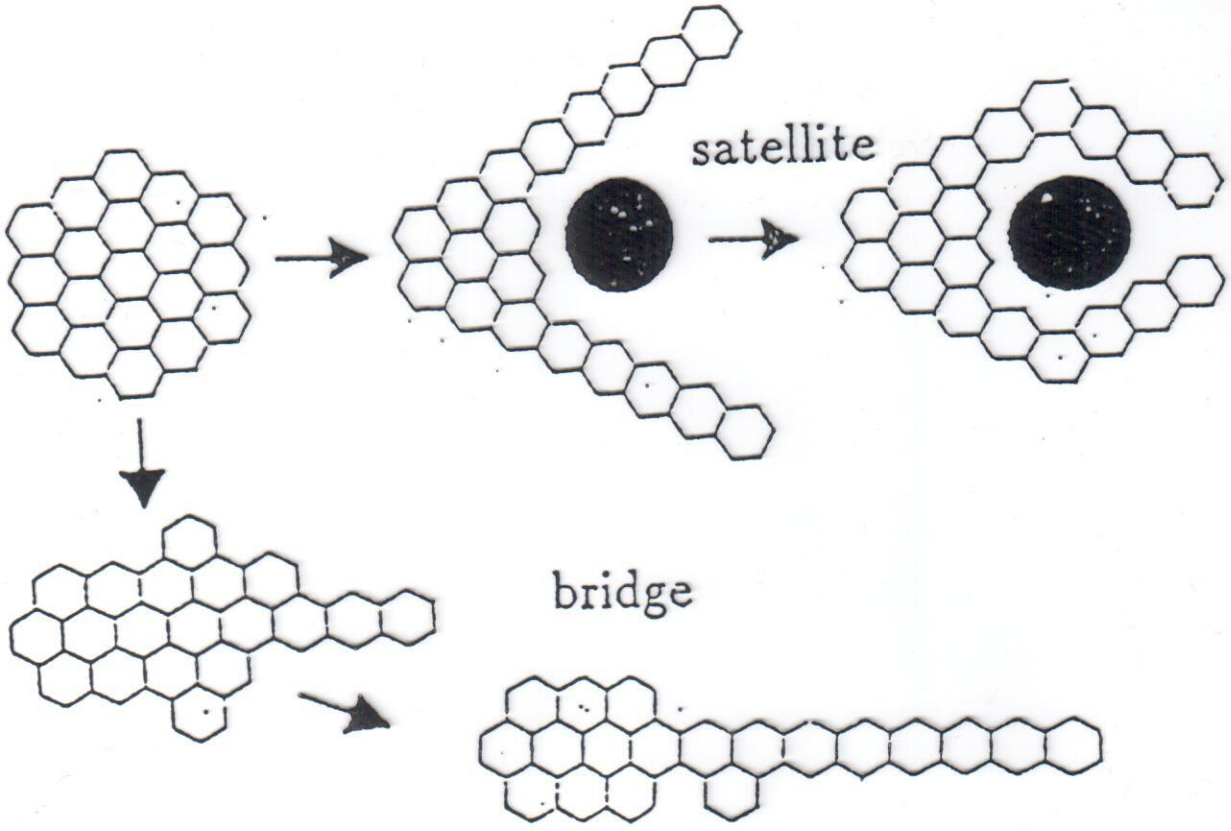


Figure 1: Applications of Metamorphic Robots

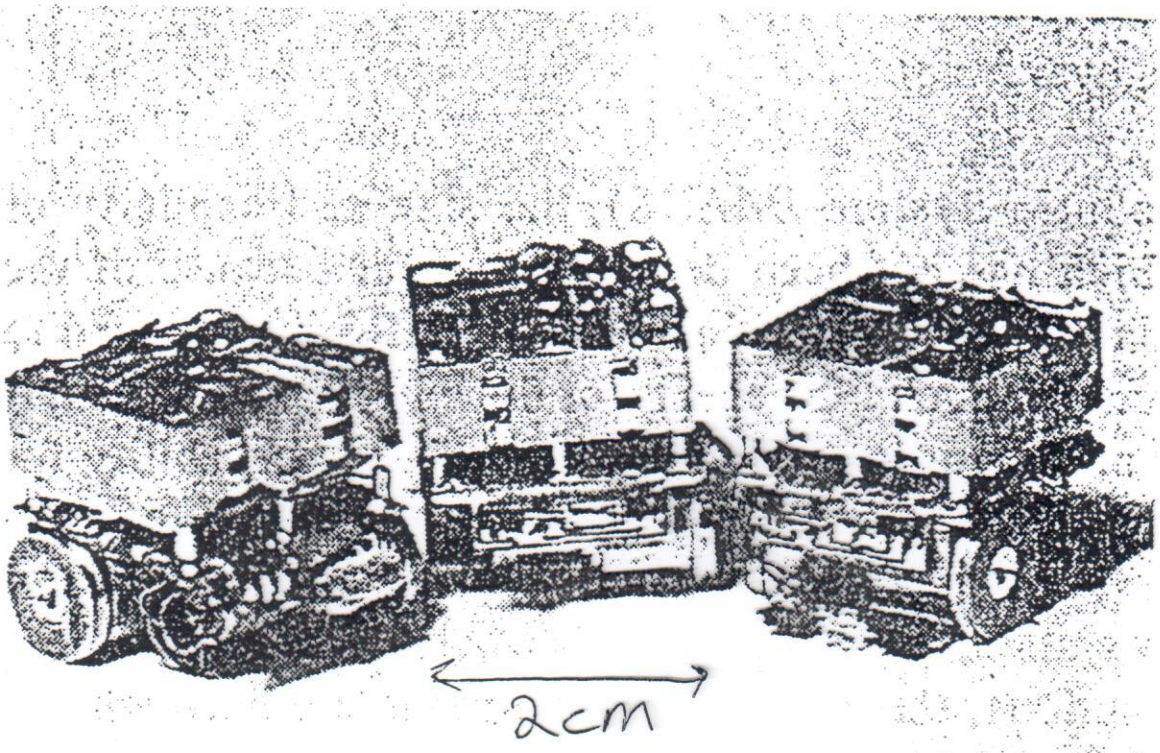
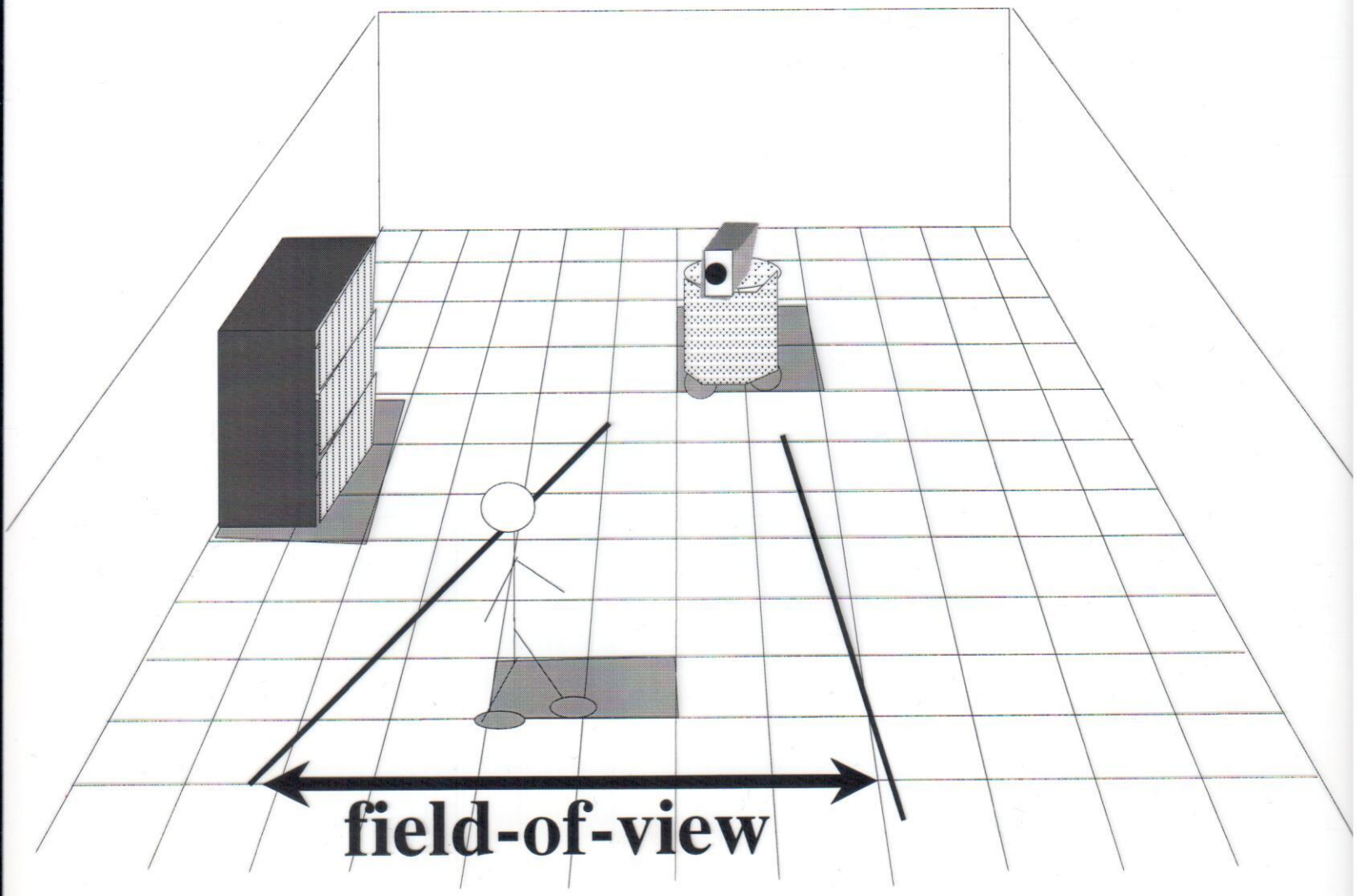


Fig.1 Programmable MARS(Micro Autonomous Robotic System)

Traditional Mobile Robot

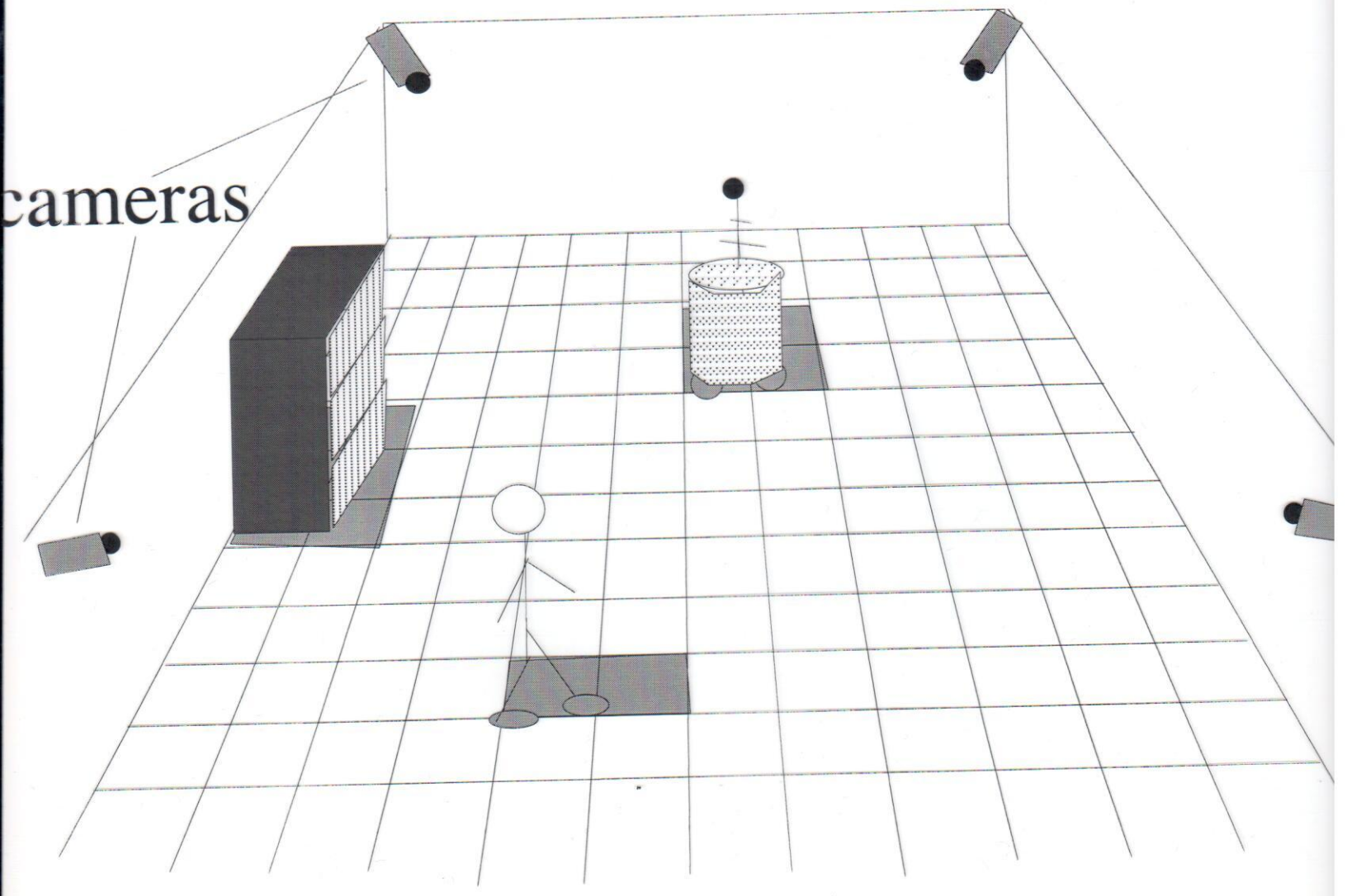


Onboard Sensing

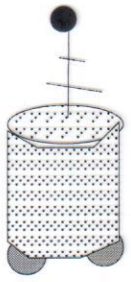
Problems:

- first person perspective
- moving sensor data fusion
- image blur (camera motion)

Sensor Networked Robot



Network Sensing



Advantages:

- third person perspective
- stationary sensor data fusion
  - self-localization
  - map fusion
- reduced image blur