

The Vision Laboratory Robotics Institute Carnegie-Mellon University

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Projects

CMU Direct-Drive Arm II

- **Arm Construction**
 - 6 d-o-f
 - brushless DC torque motors
 - modular design
- **Arm Control**
 - totally digital control
 - M68000-Multibus system for real-time control with TI320 joint processors
 - Marinco array processor for dynamics/kinematics computation
- **Robot Programming**
 - 3D model-based programming language (CMU/Franz LISP based)
 - robot simulator with 3D graphics
 - PADL-2 (Unix version) Solid modeling

3D Vision

- **Proximity Sensor**
 - multi-light source
 - surface position and orientation
 - versatile material surface
- **3D Shape Recognition**
 - real-time rangedata acquisition system
 - shape constraint precompilation method
 - fast recognition of objects with arbitrary orientation position
 - shape specification by learning or solid-modeling

Facilities

VAX 11/750

4 Mbyte Memory
400 Mbyte Disk
Berkeley Unix 4.1
C, Franzlisp
PADL2 Solid Modeling System
Lisp-based interactive Robot Programming Language

IRIS 3D Graphics System

Unix 4.2, 1.5 Mbyte Memory, 46 Mbyte disk, (1024 x 768 Visible)
1024 x 1024 Color display
Geometry Engine to perform 3D transformations of 65 thousand points for real-time 3D display
Graphics subroutines

3D Light-Stripe Range Sensor

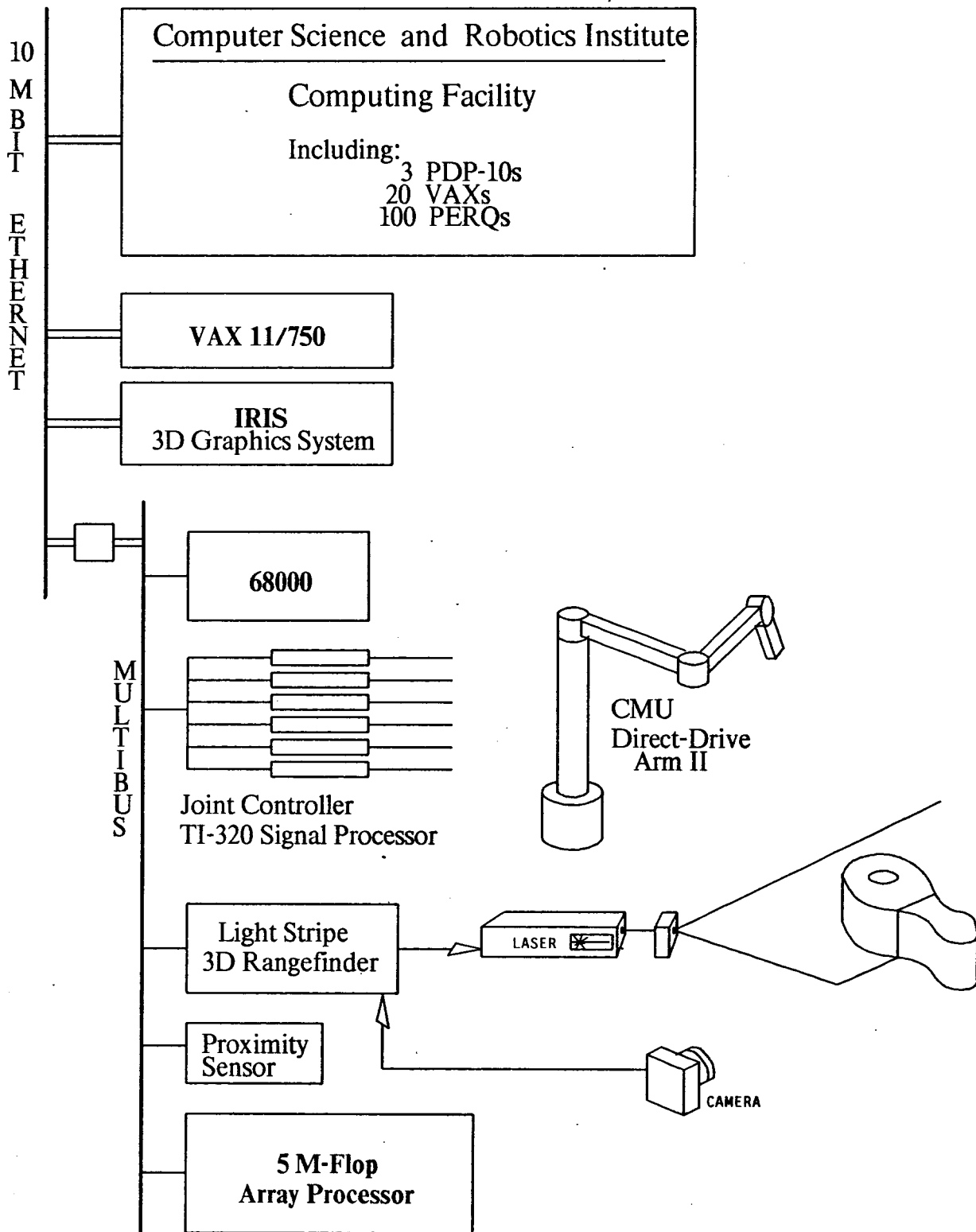
speed: 3,000 3D points/sec
resolution: 1 mm
accuracy: 1/10,000 field of view
range: (typical) 8 ft.

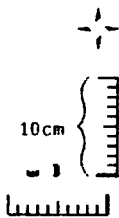
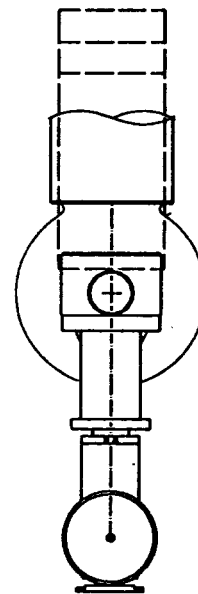
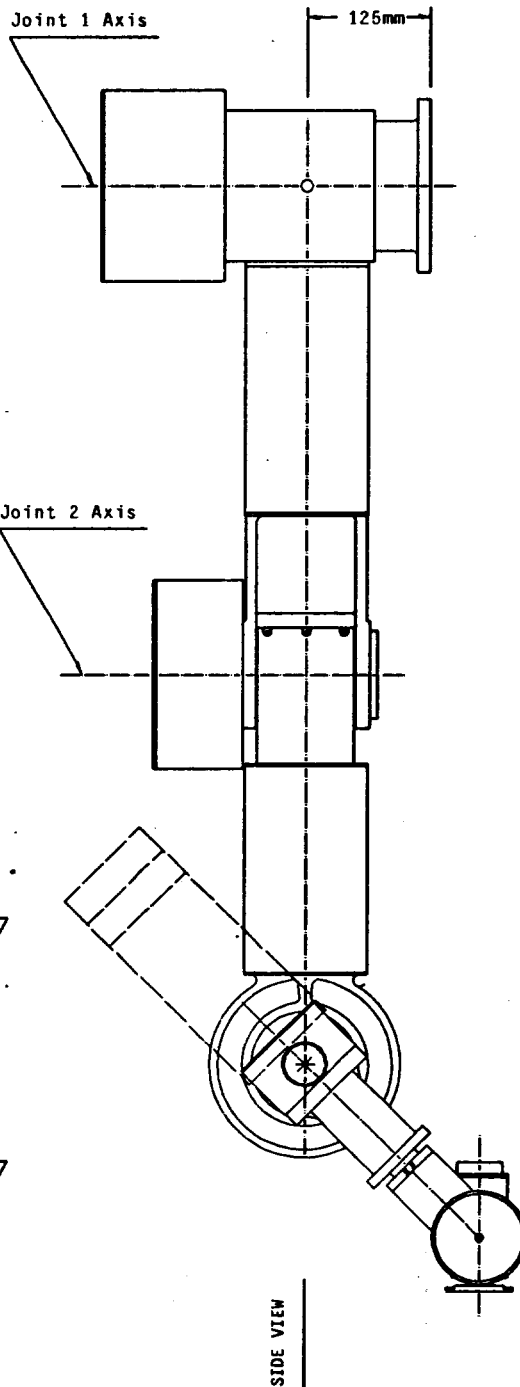
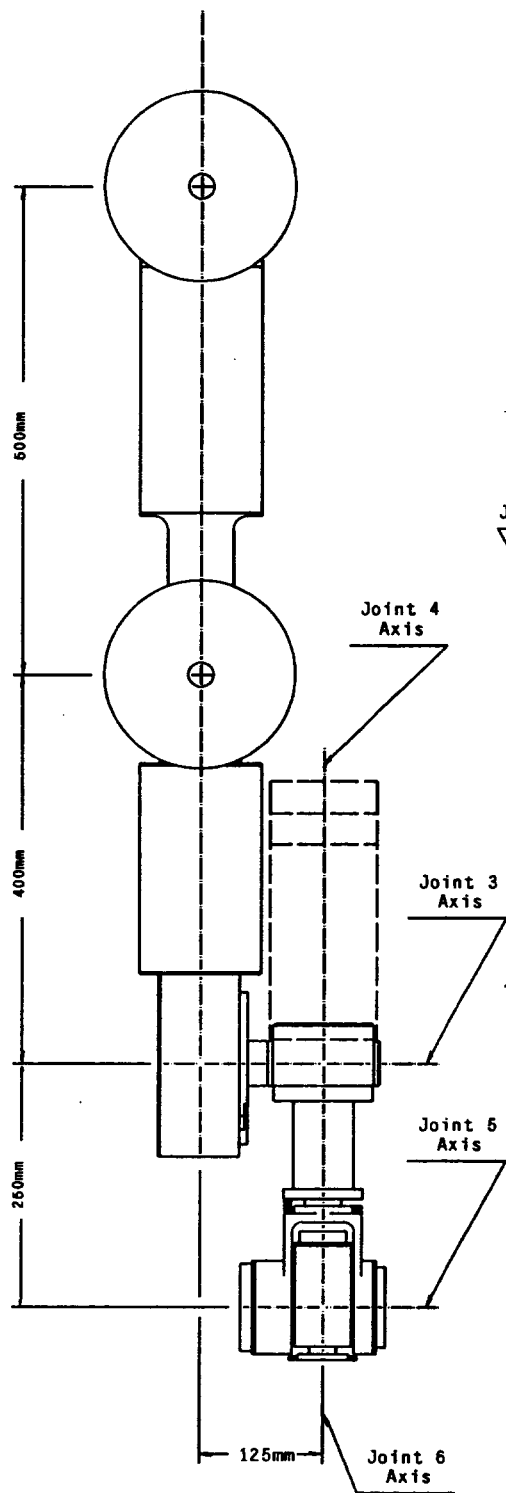
Proximity Sensor

can measure positions and orientations of surface
precision: 0.1 mm (position), 1° (orientation)
speed: 1000 measurements/sec

System for 3D Vision and Manipulation

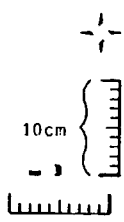
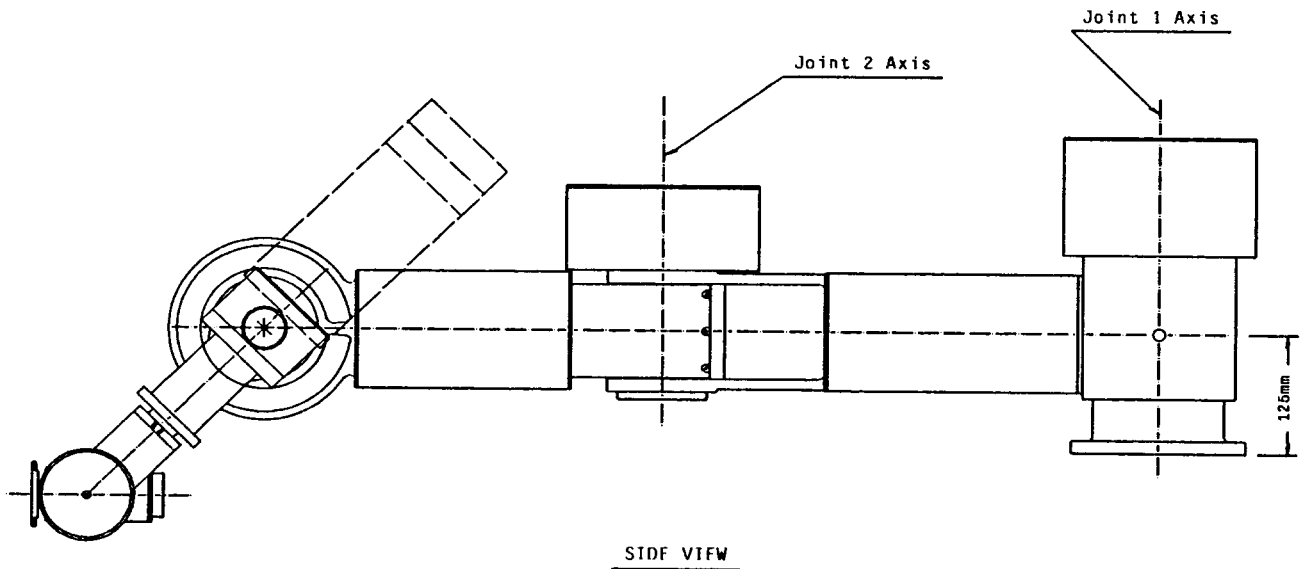
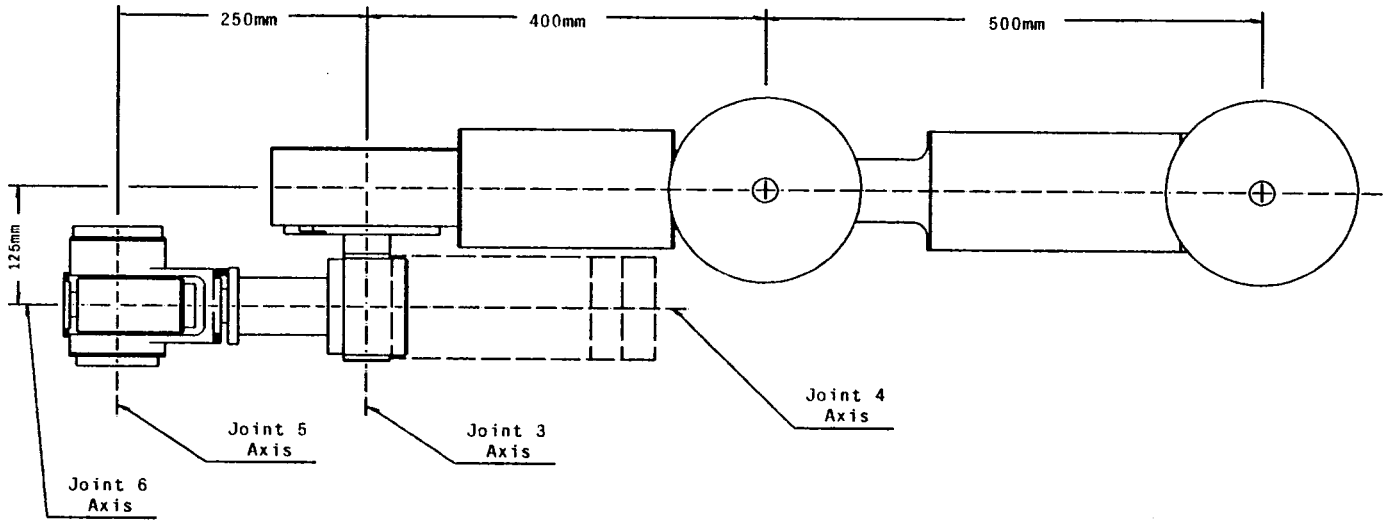
Vision Lab of The Robotics Institute




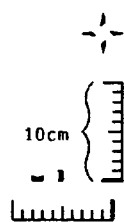
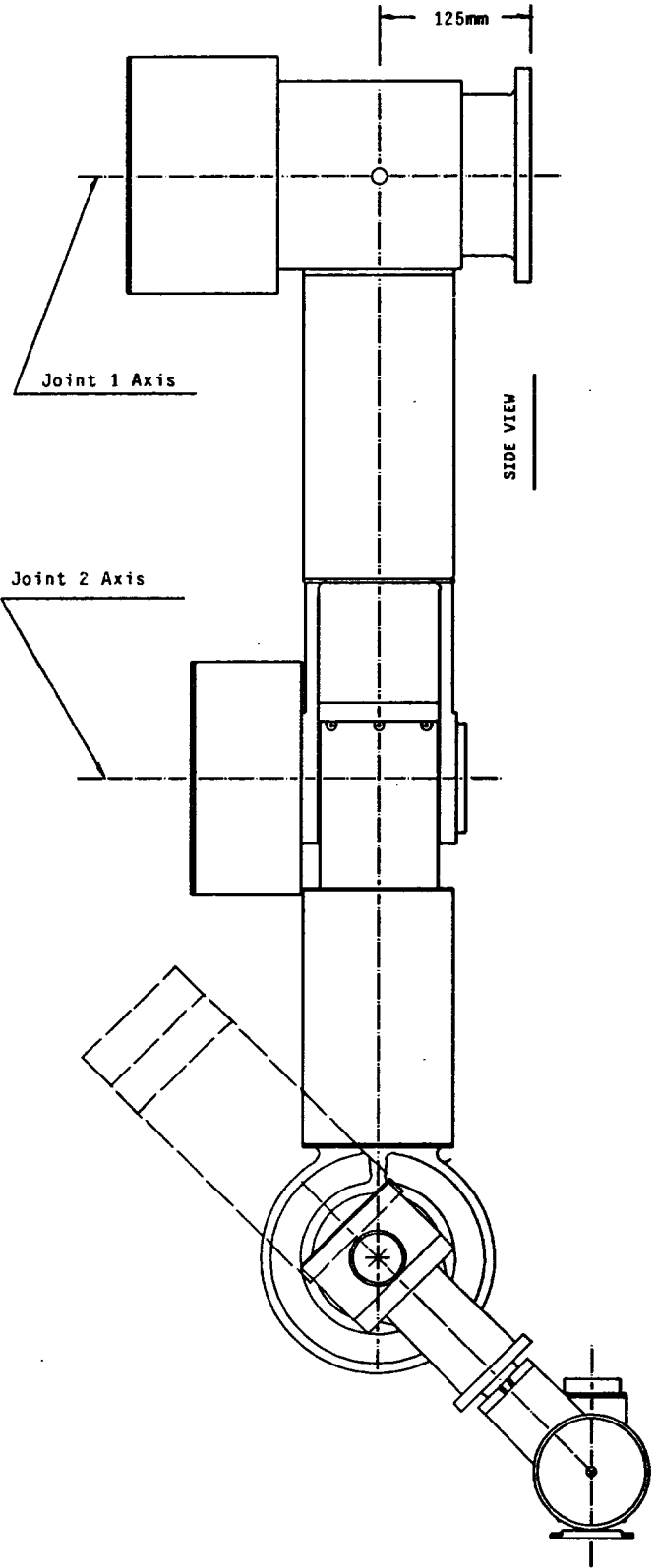
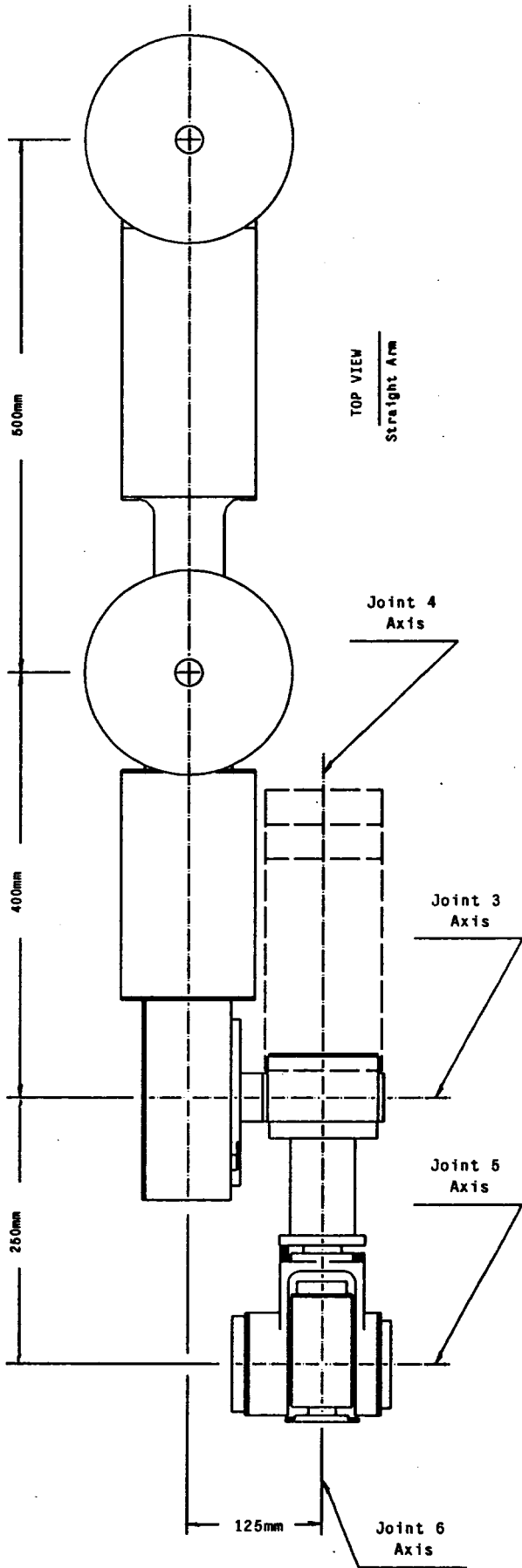


		1984
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MASTER		
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Date: 16-May-84	Scale: NTS	Approved:
Drawn by: Ratner & Schmitz		Dwg.
Redrawn by: G.Podnar		No.: VL-10018a

TOP VIEW
Straight Arm



 CMU Robotics - Vision Lab		© 1984
Title: DD ARM II - Out Line Views		
File: /usr/gwp/d.dd2/DD2o11.dp		
Date: 16-May-84	Scale: NTS	Approved:
Drawn by: Ratner & Schmitz		Dwg. No.:
Redrawn by: G. Podnar		VL-10018b



		1984
CMU Robotics - Vision Lab		
Title: DD ARM II - Out Line Views (Larger drawing image.)		
File: /usr/gwp/d.dd2/DD2o12.dp		
Date: 16-May-84	Scale: NTS	Approved:
Drawn by: Ratner & Schmitz		Dwg.
Redrawn by: G.Podnar		No.: VL-10018c