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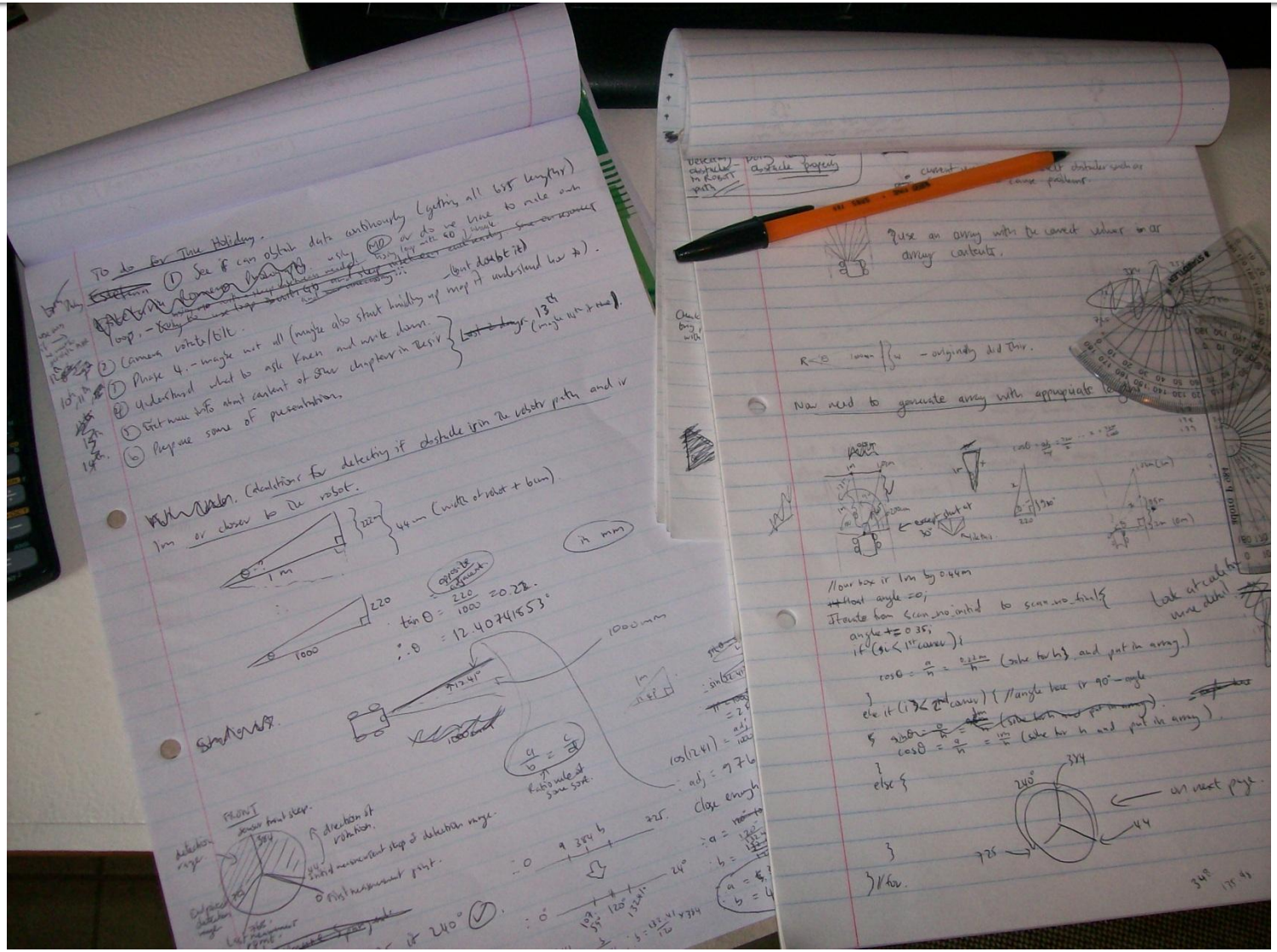
Fiducial Marker Navigation for Robotic Systems

Reminder

Guide a robot along a random route using a fiducial marker.

- Initially a straight path
- Will then involve turning
- Will contain obstacles – marker still always visible
- Marker will not always be visible – perhaps owing to higher obstacles

Planning – Bit different to Mitch's style

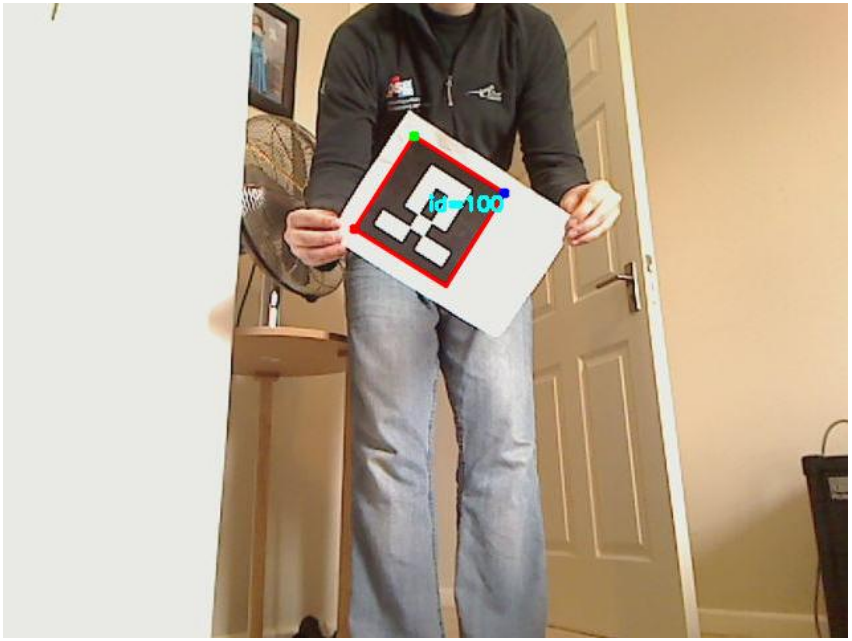


Issues & Alterations

- ARToolKit -> ArUco (Based on OpenCv)
- Flash card upgraded from 4GB (80x) – 16GB (266x)
- Poor accuracy from odometry reading, therefore no SA's in practice

What I've done!

- Fiducial marker produced and chosen
- Accurate recognition of markers
- Robot following marker in straight line
- Robot following marker with turning involved
- Robot detects obstacles in it's path
- *Robot follows marker avoiding single obstacle… Almost!*



Using lidar to map

- Lidar scans 240 degree range and detects anything up to 5.6m away
- Returns the lengths to detected obstacles
- Using some maths, (x,y) coordinates of obstacles can be calculated
- Plot coordinates with plotting tool

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403	-44
403	-42
404	-39
407	-37
398	-34
407	-32
398	-29
399	-26
399	-24
398	-22
398	-19
400	-17
405	-14
405	-12
407	-10
408	-7
407	-5
402	-2
402	0
401	2
401	4
399	7

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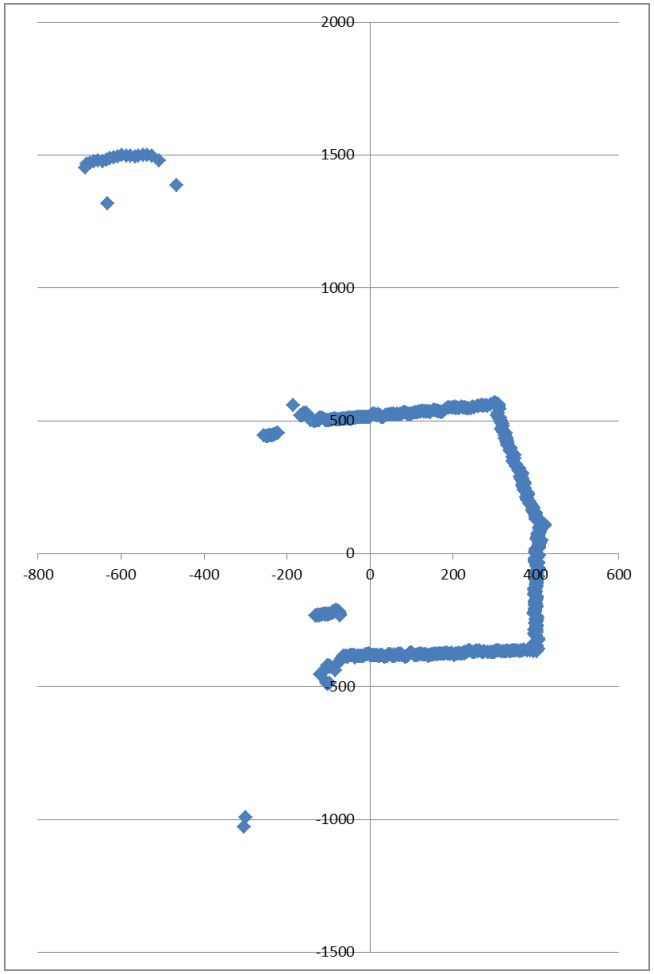

What still needs to be done

- *Robot follows marker avoiding single obstacle… Almost!*
- Robot follows marker avoiding many obstacles
- Robot wanders using maze solving methods when marker is lost
- Optimise ArUco's detection method
- Finish off writing thesis

Questions