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Embedded motion control

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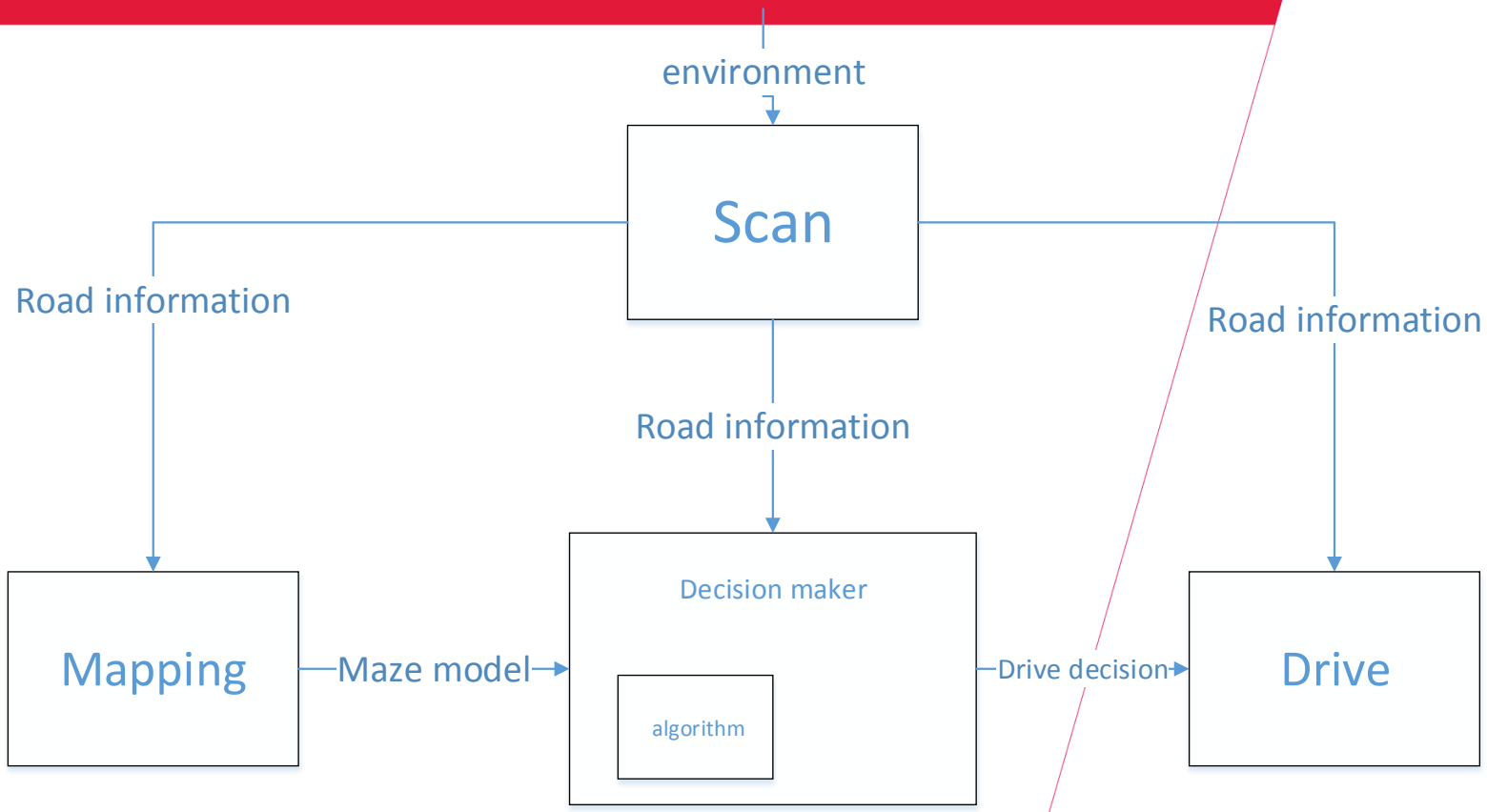
Where innovation starts

Contents of presentation

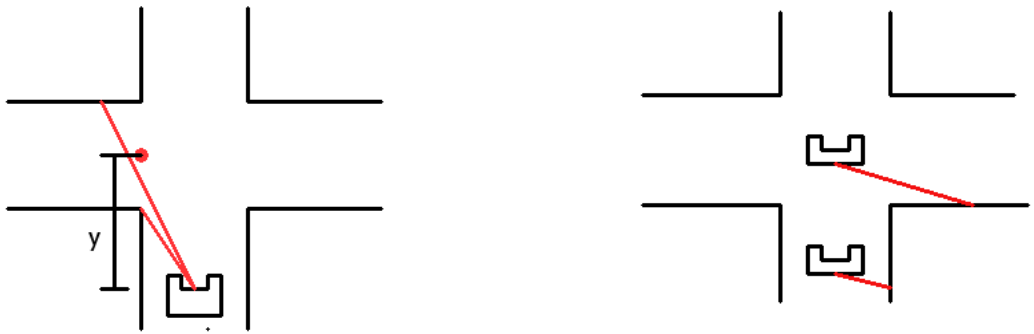
- Software structure
- Scan
- Drive
- Mapping
- Decision maker&Algorithm
- Progress and plan

Software structure



Scan

- Left&right opening detection
  - Detect opening by check distance change of laser data
  - Obtain middle point position and nearest corner point position

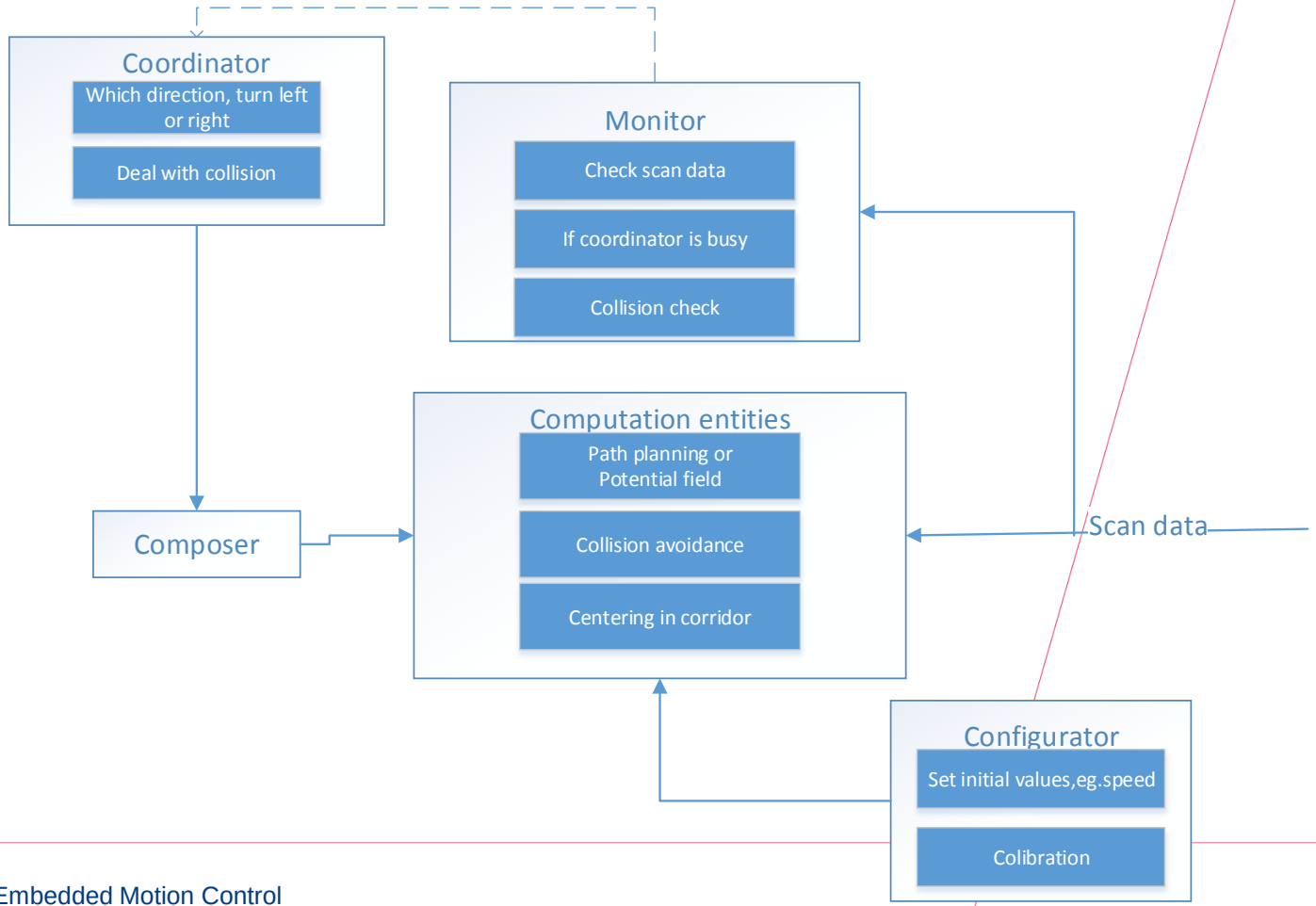


Scan

- Front opening detection:
  - Assuming always front open
  - Until meet a front close case, laser data change

Drive

Composition pattern of Drive block

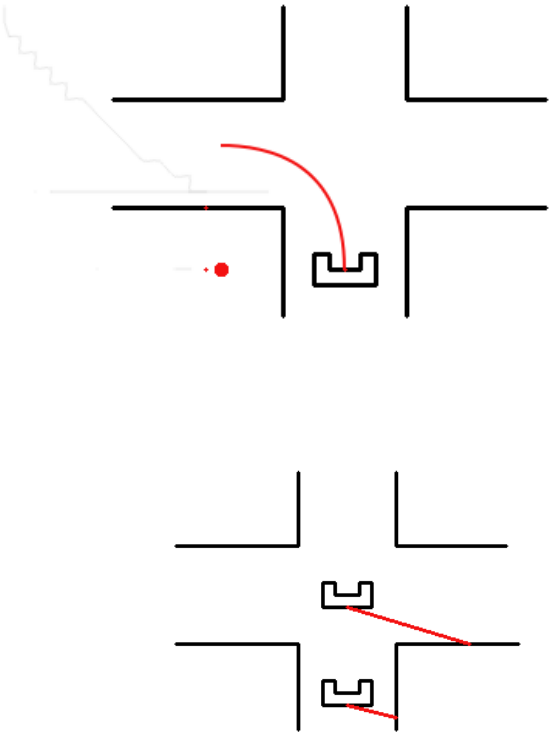


Drive

- Basic actions
  - Drive forward
  - Turn left and right
  - Turn back
  - Without bumping into walls by using scan data

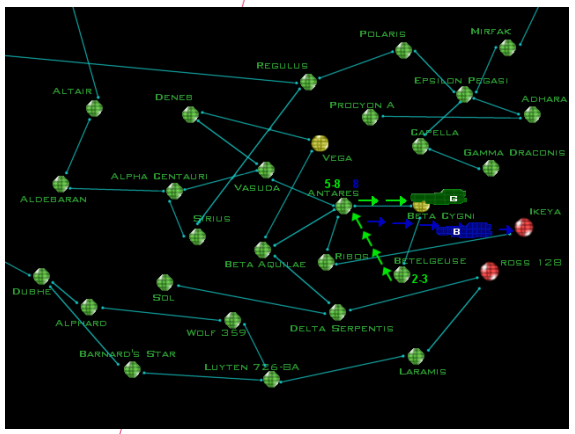
Drive

- Alternative solution to turn a corner
  - Path planning
  - Potential field
  - Simple method



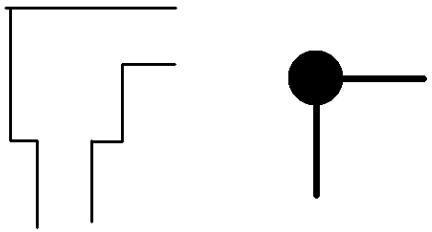
•Mapping

- Mapping:
  - Input: possible choices from scan
  - Store one intersection as one node, marked with visit time(0 or 1) and global coordinates
  - Connect nodes to indicate different paths marked with visit time(0,1 or 2)
  - Possibly useful information– how long did it take me through this path



Mapping

- Map a open space -- possible solutions
  - As one node



  - As multiple nodes

- Previous information dependent
  - Where did I come from– last node
  - Set up for next node

Decision maker&Algorithm

- Input:
  - mapping model
  - Scan data

- Output: specific drive action command

- Implement Trémaux's algorithm

- Different situations when visiting a node
  - If it is a dead-end node
    - Did the door open for me
  - Any unvisited paths
  - Any paths with 1 visit
  - Paths with 2 visit(not a choice)

•Progress and plan

• Progress:

•Plan

Thank you !