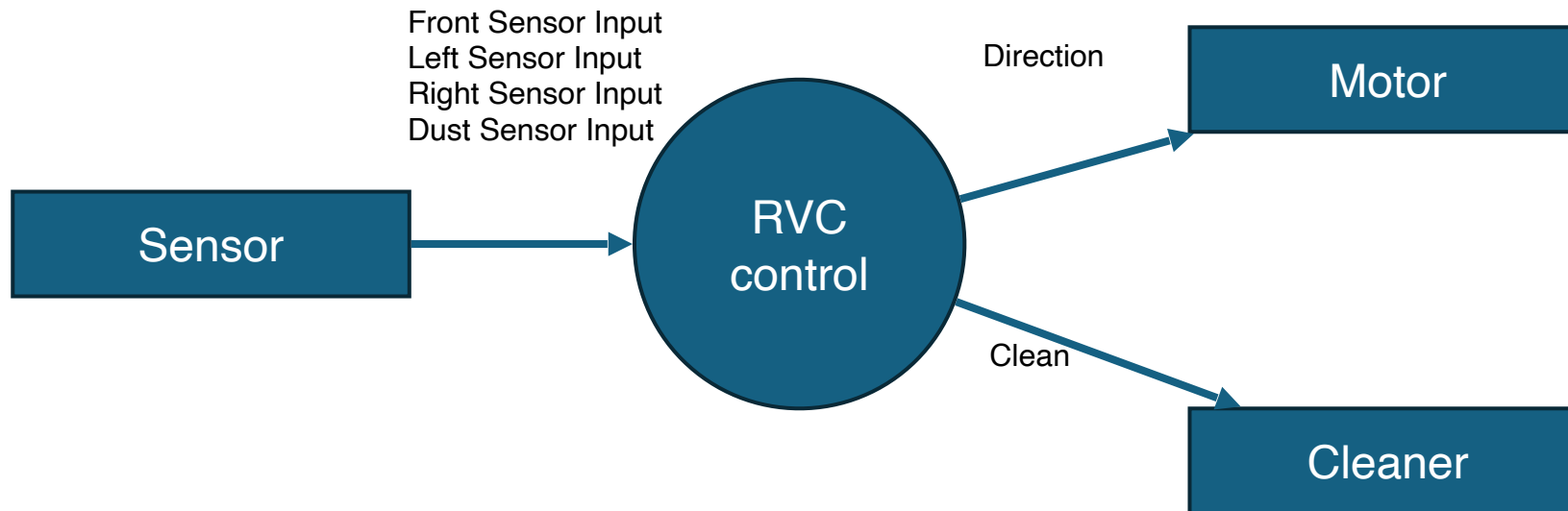


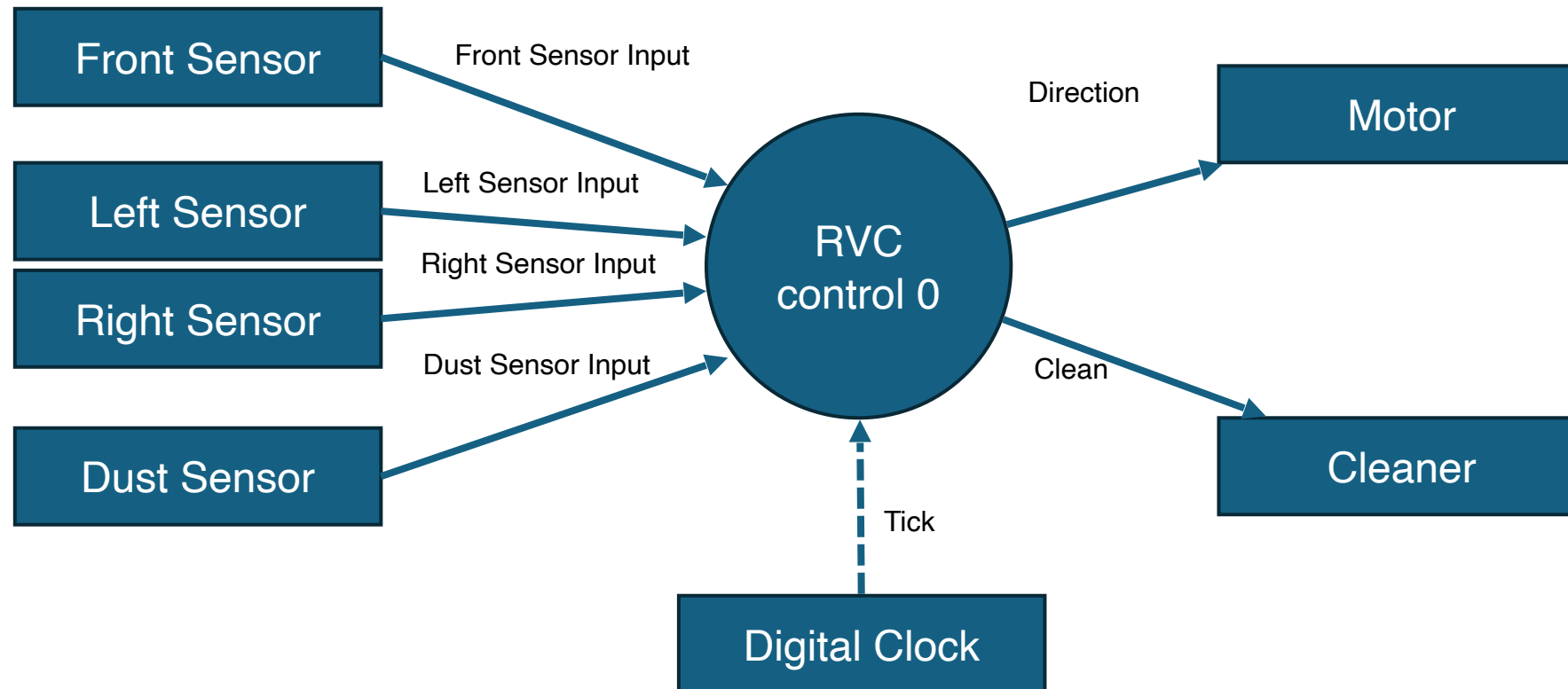
Structured Analysis for the RVC Control Software

팀: 13 강민호 고경모 문무현 안병현

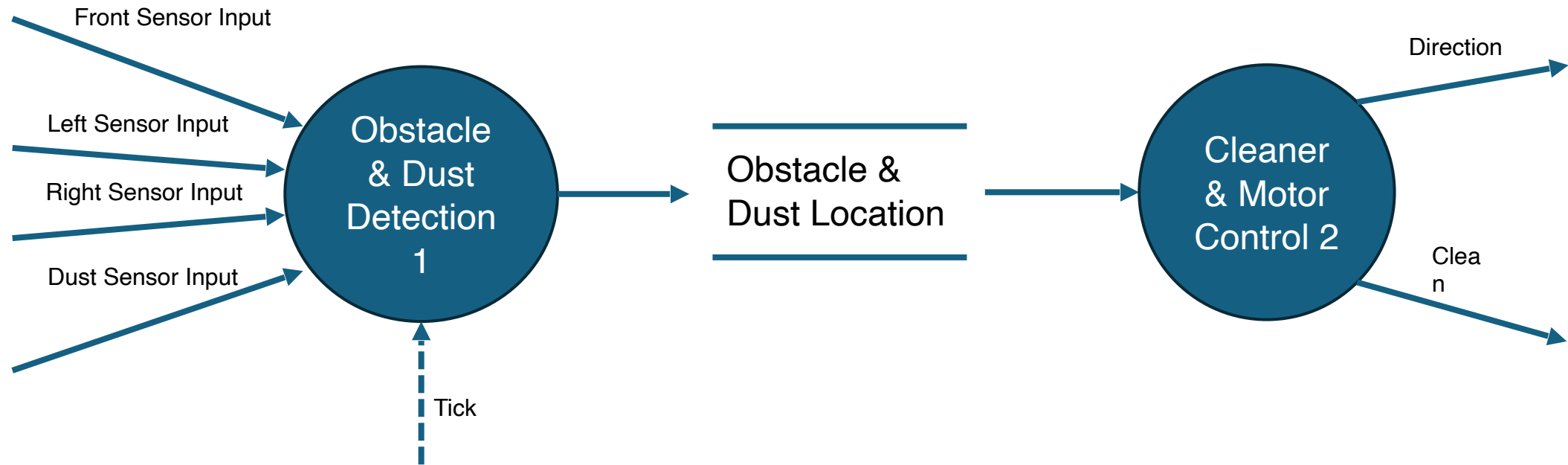
System Context Diagram



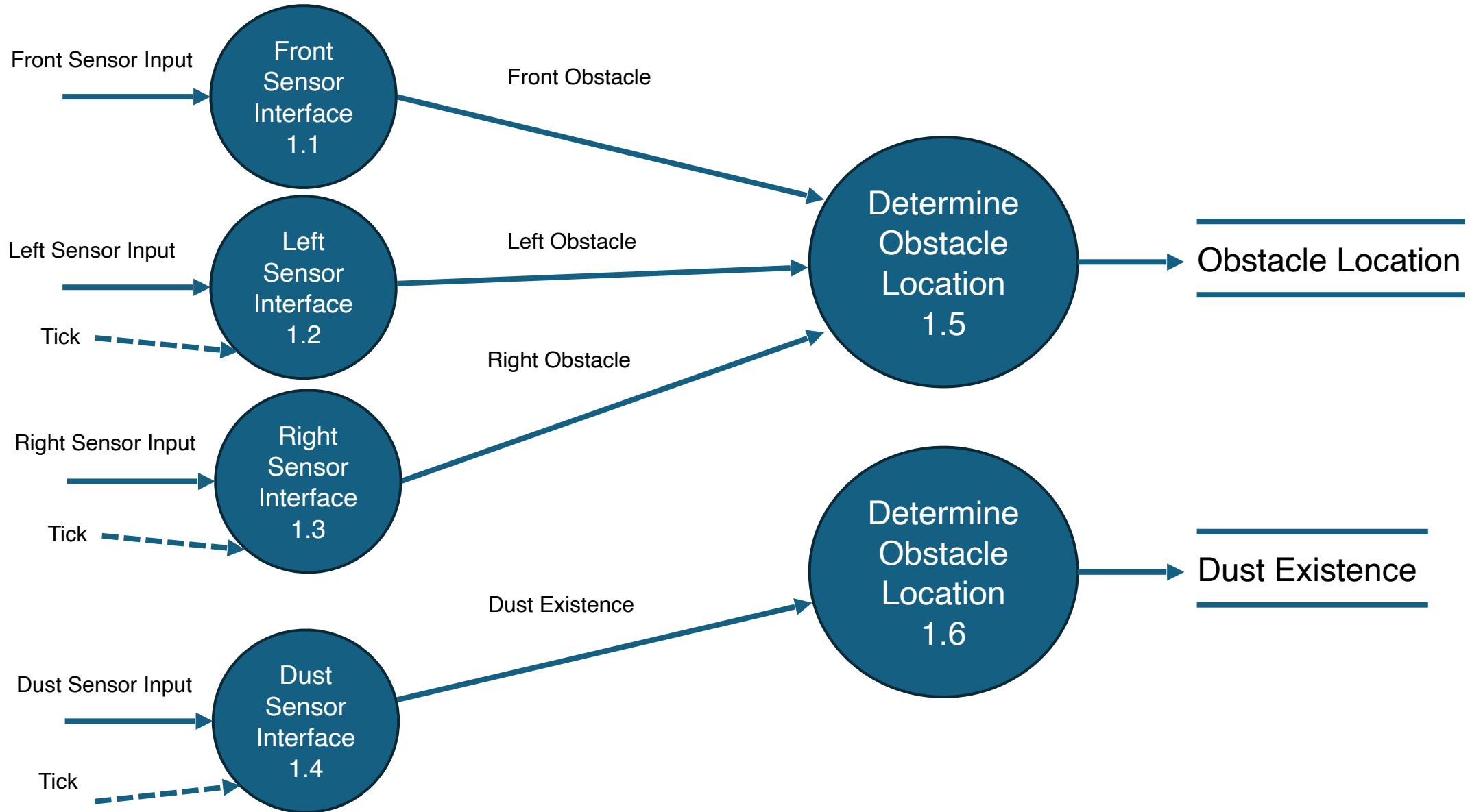
DFD Level 0



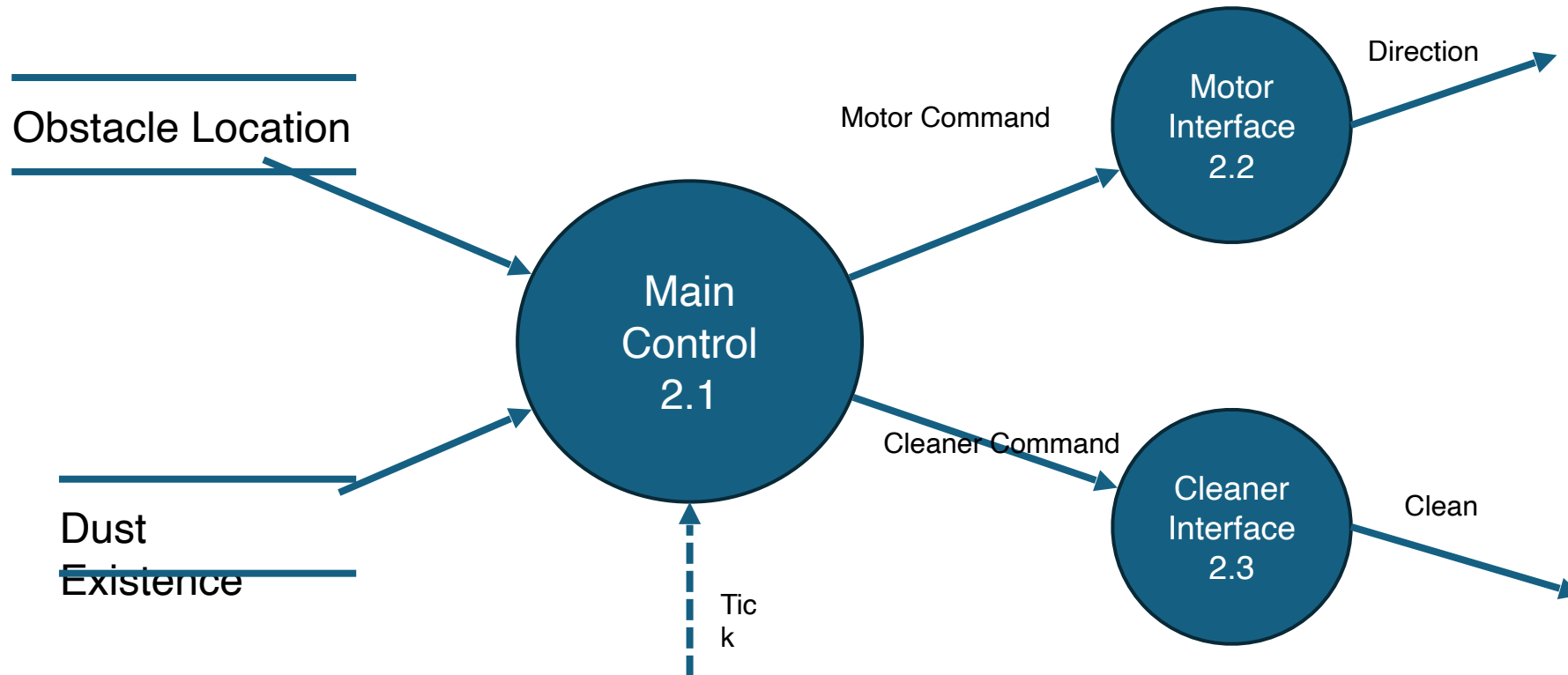
DFD Level 1



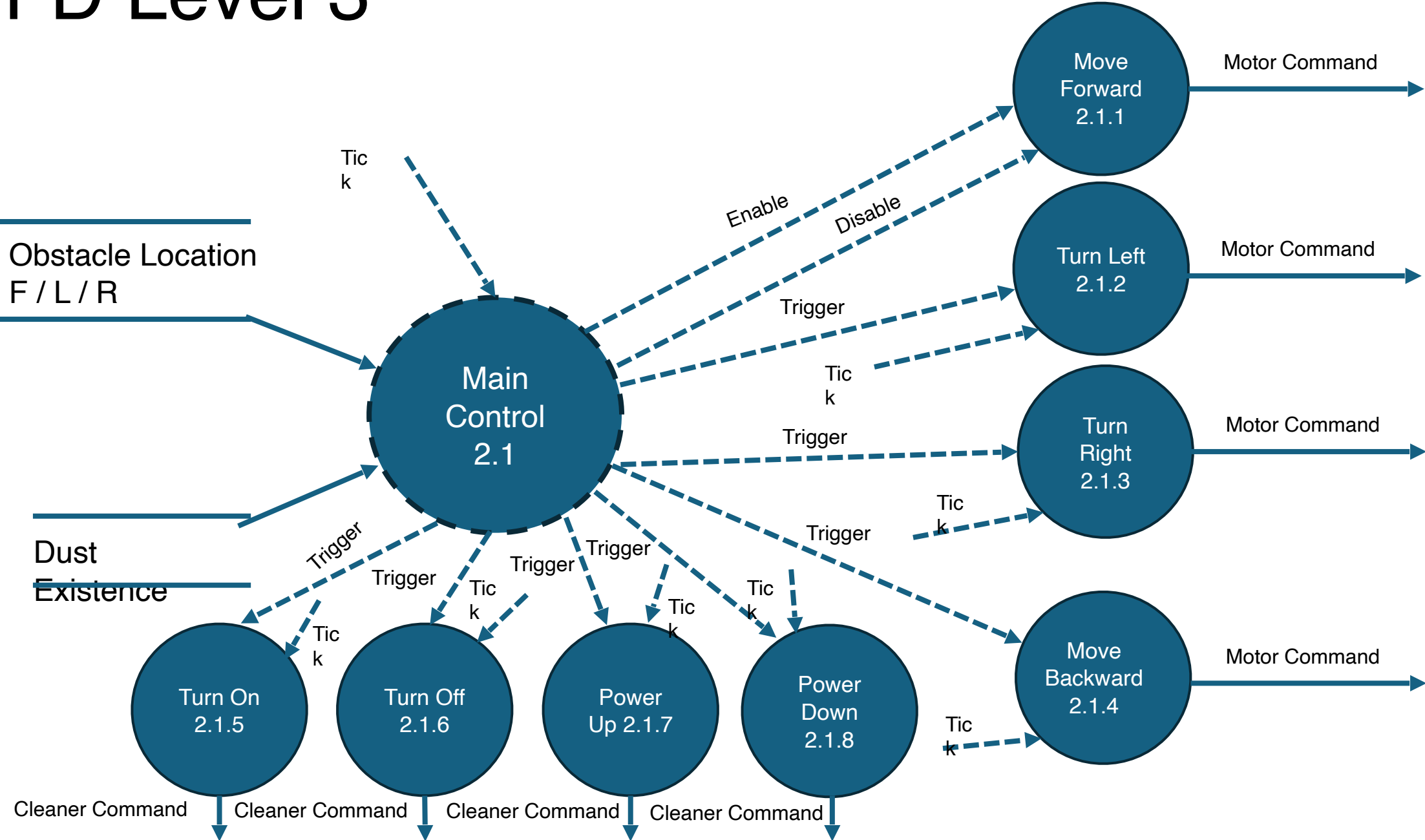
DFD Level 2



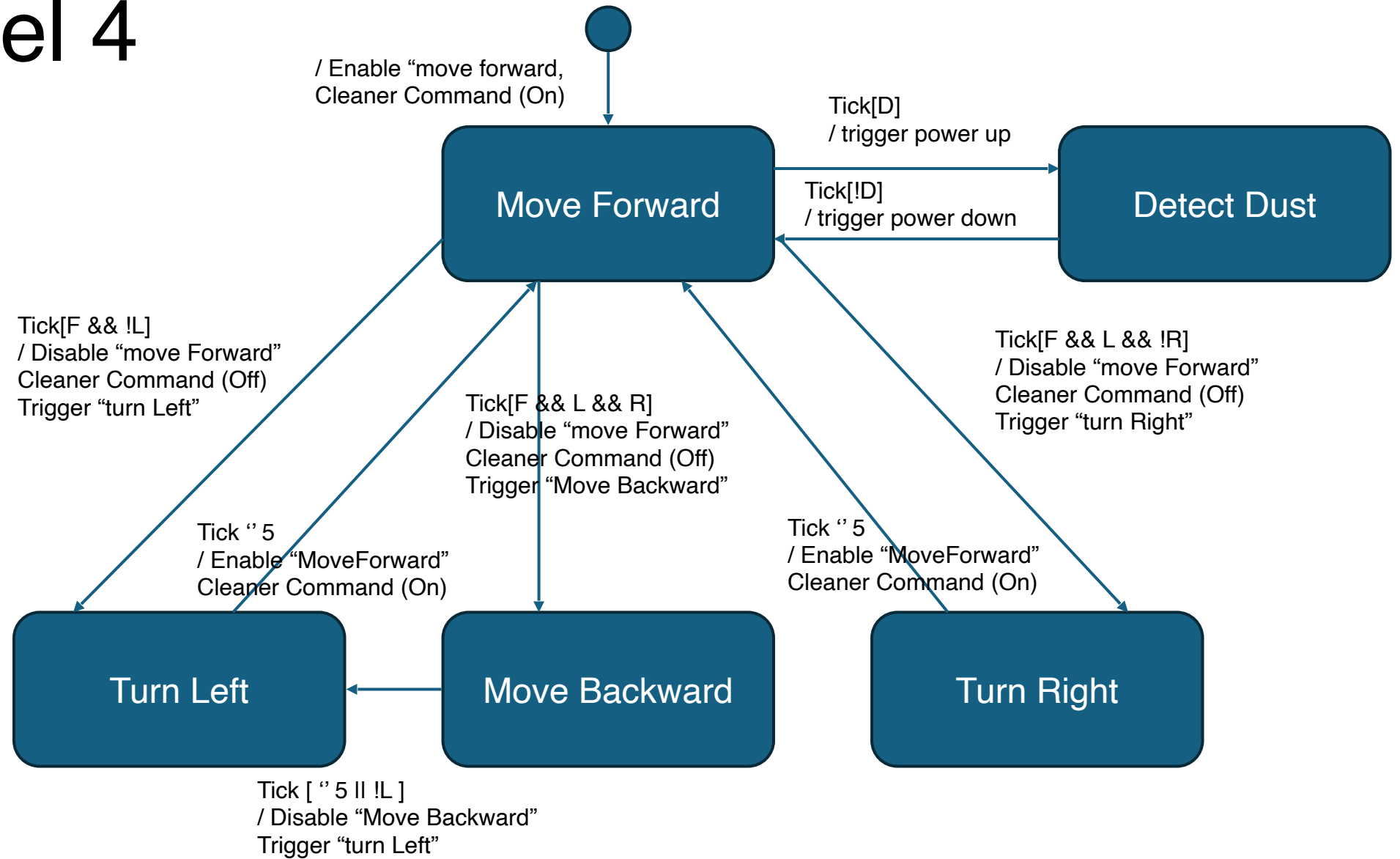
DFD Level 2



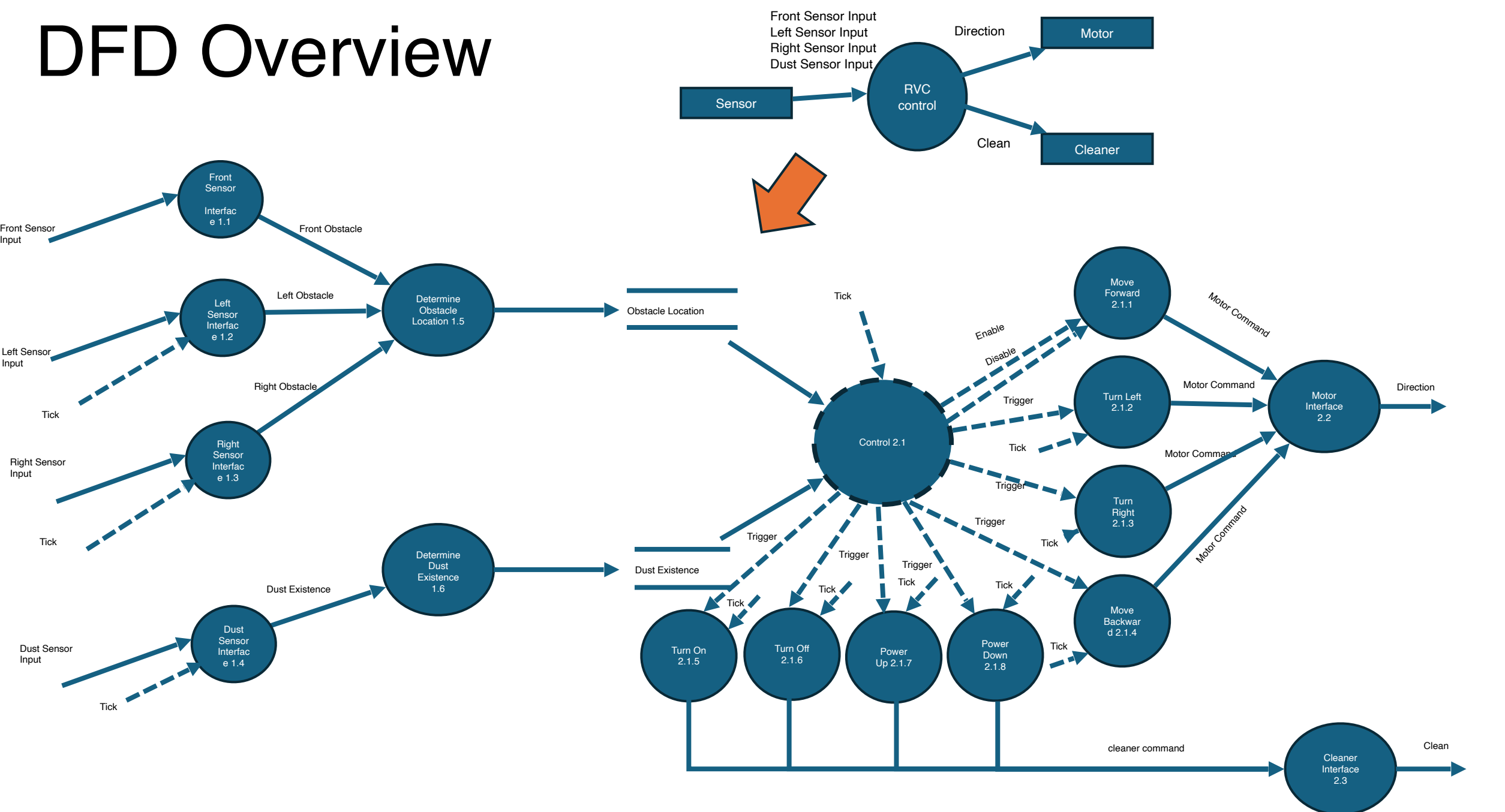
DFD Level 3



DFD Level 4



DFD Overview



Process Specification

Ref. No.	1.1
Name	Front Sensor Interface
Input	Front Sensor input (+Data structure if possible)
Output	Front Obstacle (+Data structure)
Process Description	“Front Sensor Input” process reads an analog value of the front sensor periodically, converts it into a digital value such as True/False, and assigns it into output variable “Front Obstacle.”

Ref. No.	1.2
Name	Left Sensor Interface
Input	Left Sensor input (+Data structure if possible), Tick
Output	Left Obstacle (+Data structure)
Process Description	“Left Sensor Input” process reads an analog value of the left sensor periodically, converts it into a digital value such as True/False, and assigns it into output variable “Left Obstacle.”

Ref. No.	1.3
Name	Right Sensor Interface
Input	Right Sensor input (+Data structure if possible), Tick
Output	Right Obstacle (+Data structure)
Process Description	“Right Sensor Input” process reads an analog value of the left sensor periodically, converts it into a digital value such as True/False, and assigns it into output variable “Right Obstacle.”

Ref. No.	1.4
Name	Dust Sensor Interface
Input	Dust Sensor input (+Data structure if possible), Tick
Output	Dust Existence (+Data structure)
Process Description	“Dust Sensor Input” process reads an analog value of the dust sensor periodically, converts it into a digital value such as True/False, and assigns it into output variable “Dust Existence.”

Process Specification

Ref. No.	1.5
Name	Determine Obstacle Location
Input	Front Obstacle, Right Obstacle, Left Obstacle
Output	Obstacle Location
Process Description	“F/R/L Obstacle” process reads an digital value of the obstacle, determines obstacle location, and assigns it into output variable “Obstacle Location”

Ref. No.	2.1
Name	Main Control
Input	Obstacle Location (+Data structure), Dust Existence (+Data structure), Tick
Output	Motor Command, Cleaner Commander
Process Description	“Main Control” process reads Obstacle Location and Dust Existence, determines direction cleaner can move and whether to clean up and assigns it into “Motor Command” and “Cleaner Command” respectively.

Ref. No.	1.6
Name	Determine Dust Existence
Input	Dust Existence
Output	Dust Existence
Process Description	“Dust Existence” process reads presence of dust, determines dust existence, and assigns it into output variable “Dust Existence.”

Ref. No.	2.1.1
Name	Move Forward
Input	Enable OR Disable
Output	Motor Command
Process Description	“Move Forward” process reads Enable/Disable information comes from “Main Control” process and assign it into the front direction part of Motor Command.

Process Specification

Ref. No.	2.1.2
Name	Turn Left
Input	Trigger, Tick
Output	Motor Command
Process Description	“Turn Left” process gets the presence of an obstacle on the left side and updates the left direction part of “Motor Command” based on it.

Ref. No.	2.1.4
Name	Move Backward
Input	Trigger, Tick
Output	Motor Command
Process Description	“Move Backward” process gets the presence of an obstacle on the left, right and forward side and updates the back direction part of “Motor Command” based on those three pieces of information.

Ref. No.	2.1.3
Name	Turn Right
Input	Trigger, Tick
Output	Motor Command
Process Description	“Turn Right” process gets the presence of an obstacle on the right side and updates the right direction part of “Motor Command” based on it.

Ref. No.	2.1.5
Name	Turn On
Input	Trigger, Tick
Output	Cleaner Command
Process Description	“Turn On” process run when the trigger turn-on input is received and returns to the turn-on command.

Process Specification

Ref. No.	2.1.6
Name	Turn Off
Input	Trigger, Tick
Output	Cleaner Command
Process Description	“Turn Off” process run when the trigger turn-off input is received and returns to the turn-off command.

Ref. No.	2.1.8
Name	Power Down
Input	Trigger, Tick
Output	Motor Command
Process Description	“Power Down” process runs the power-down part of “Cleaner Command” and close the power-on part of “Cleaner Command” if “Cleaner Command” if there is not dust on the floor.

Ref. No.	2.1.7
Name	Power Up
Input	Trigger, Tick
Output	Cleaner Command
Process Description	“Power Up” process runs the power-up part of “Cleaner Command” and close the power-off part of “Cleaner Command” if “Cleaner Command” if there is dust on the floor.

Ref. No.	2.2
Name	Motor Interface
Input	Motor Command
Output	Direction
Process Description	“Motor Interface” process reads Motor Command and determines direction Robot Vacuum Cleaner goes.

Process Specification

Ref. No.	2.3
Name	Cleaner Interface
Input	Cleaner Command
Output	Clean
Process Description	“Cleaner Interface” process reads Cleaner Command and determines cleaning and cleaning intensity.

Data Dictionary

Input/ output event	Description	Format / Type
Front Sensor Input	Detects obstacles in front of the RVC	True / False , Interrupt
Left Sensor Input	Detects obstacles in the left side of the RVC periodically	True / False , Periodic
Right Sensor Input	Detects obstacles in the right side of the RVC periodically	True / False , Periodic
Dust Sensor Input	Detects dust on the floor periodically	True / False , Periodic
Direction	Direction commands to the motor (Go forward / turn left / turn right / move backward)	Forward / Left / Right / Backward
Clean	Turn on / Turn off / Power - up / Power - down	On / Off / Up / Down
Front Obstacle	Obstacles exist in front of the RVC	True / False , Periodic
Left Obstacle	Obstacles exist in the left side of the RVC	True / False , Periodic
Right Obstacle	Obstacles exist in the right side of the RVC	True / False , Periodic
Dust Existence	Dust exist on the floor	True / False , Periodic
Obstacle Location	Position of obstacles	[FLR], periodic
Dust Existence(2)	Dust exist on the floor	[D], periodic