

# RVC Model

201510283

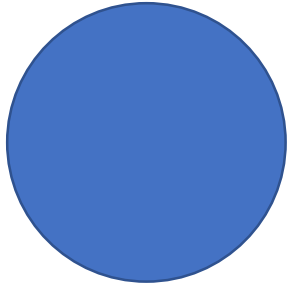
임진웅

# Statement of Purpose – RVC

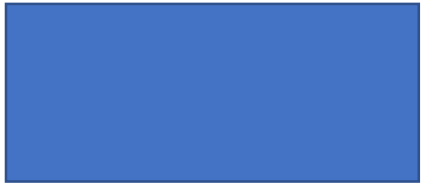
## Robot Vacuum Cleaner (RVC)

- An RVC automatically cleans and mops household surface.
- It goes straight forward while cleaning.
- If its sensors found an obstacle, it stops cleaning, turns aside, and goes forward with cleaning.
- If it detects dust, power up the cleaning for a while
- We do not consider the detail design and implementation on HW controls.
- We only focus on the automatic cleaning function.

# System Context Diagram - Notation



Process : represents the proposed system

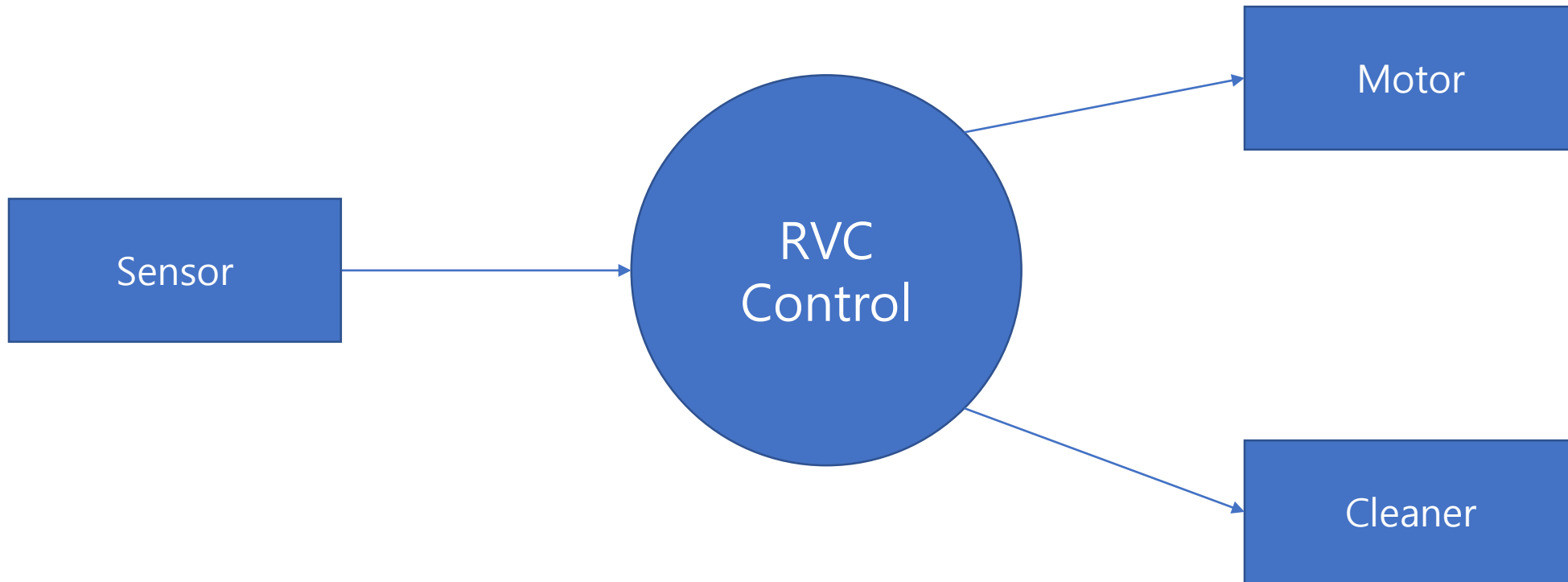


Terminator : represents the external entities



Flow : represents the in/out data flows

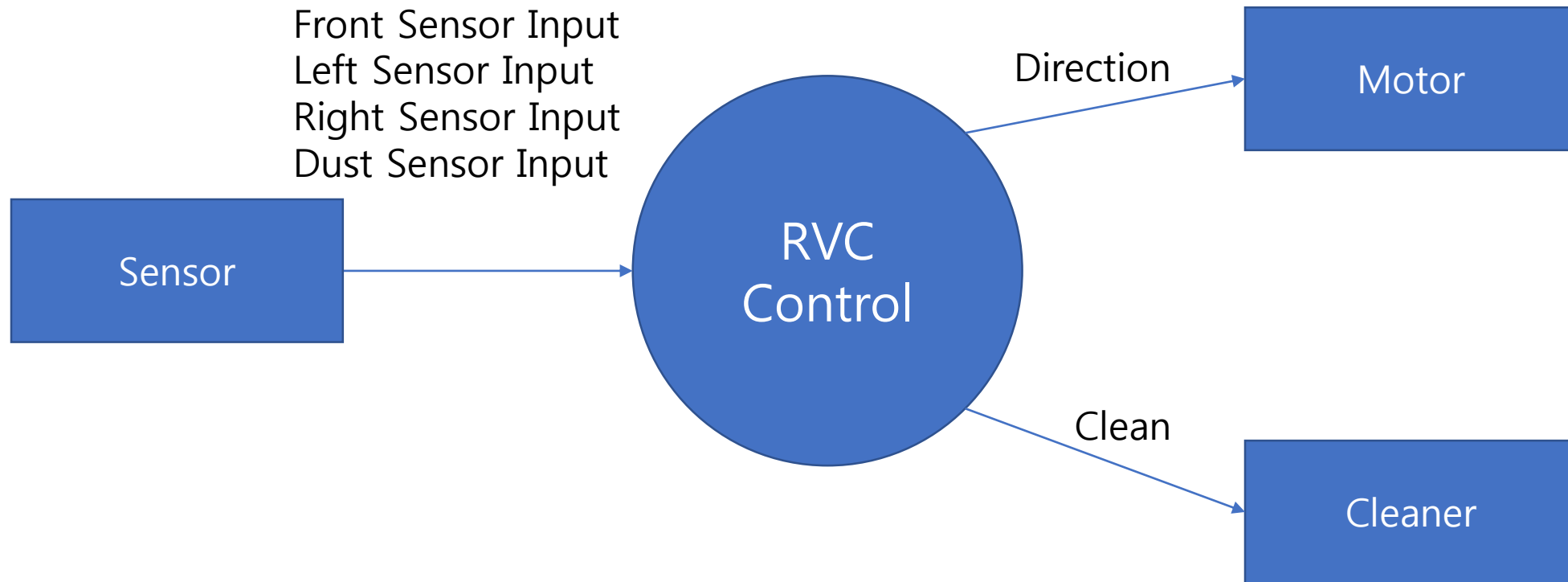
# System Context Diagram - RVC



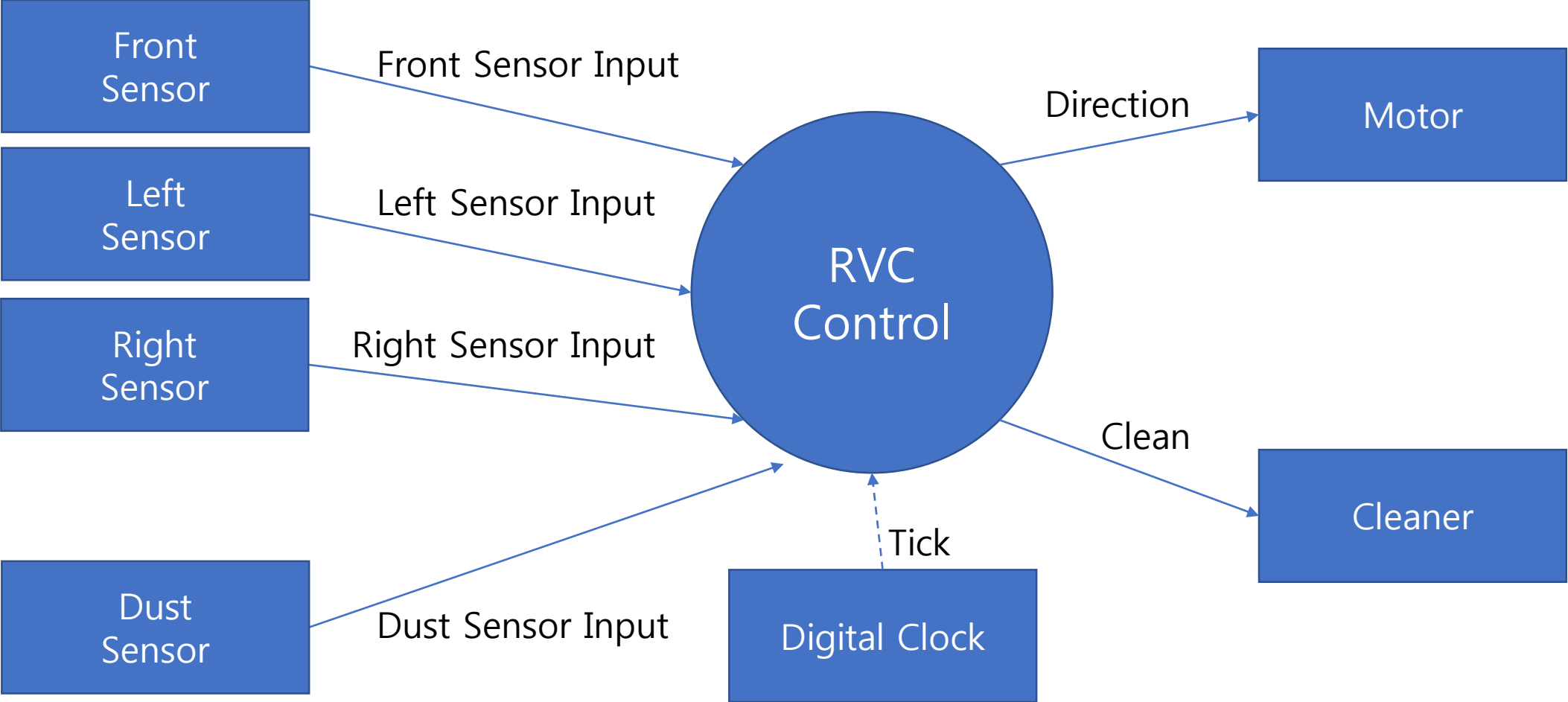
# Event List - RVC

Input/ Output Event	Description
Front Sensor Input	Detects obstacles in front of the RVC
Left Sensor Input	Detects obstacles in the left side of the RVC periodically Detects distance
Right Sensor Input	Detects obstacles in the right side of the RVC periodically Detects distance
Dust Sensor Input	Detects dust on the floor periodically
Direction	Direction command to the motor (go forward / turn left with an angle / turn right with an angle / turn a straight angle(turn left or right twice) / stop)
Clean	Turn off / Turn on / Power-up

# System Context Diagram - RVC



# DFD Level 0 - RVC

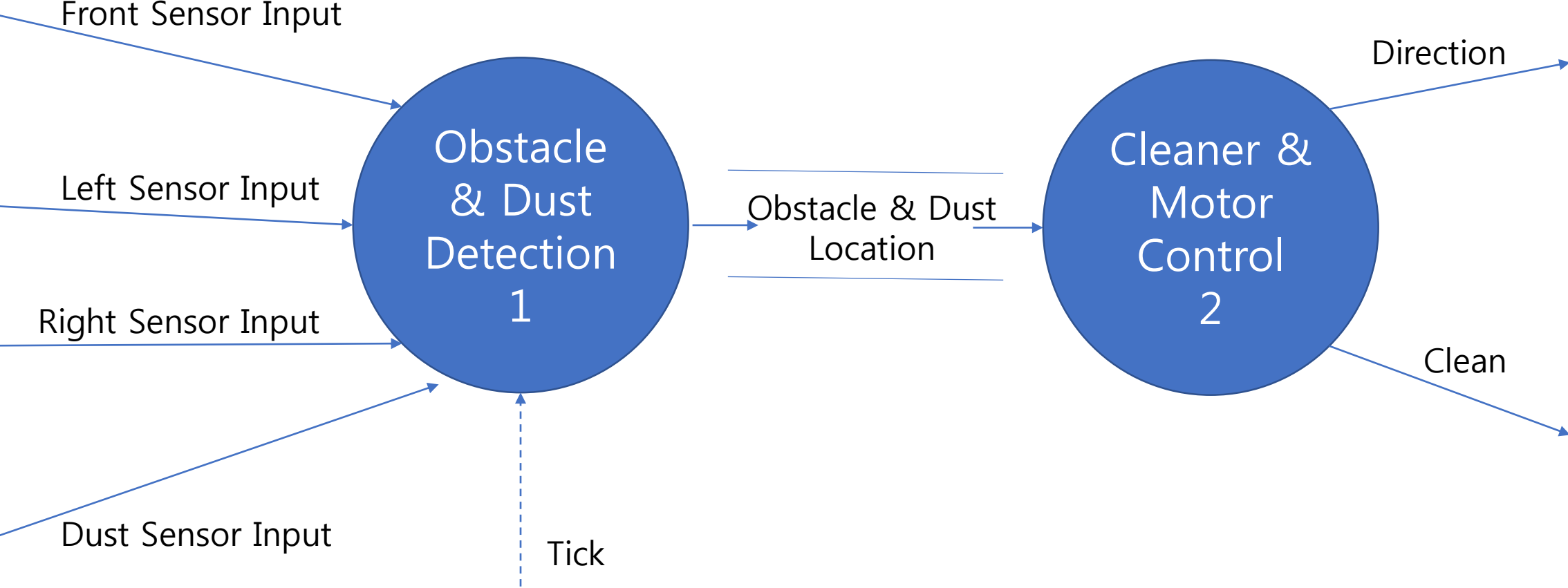


# DFD Level 0 – RVC / Data Dictionary

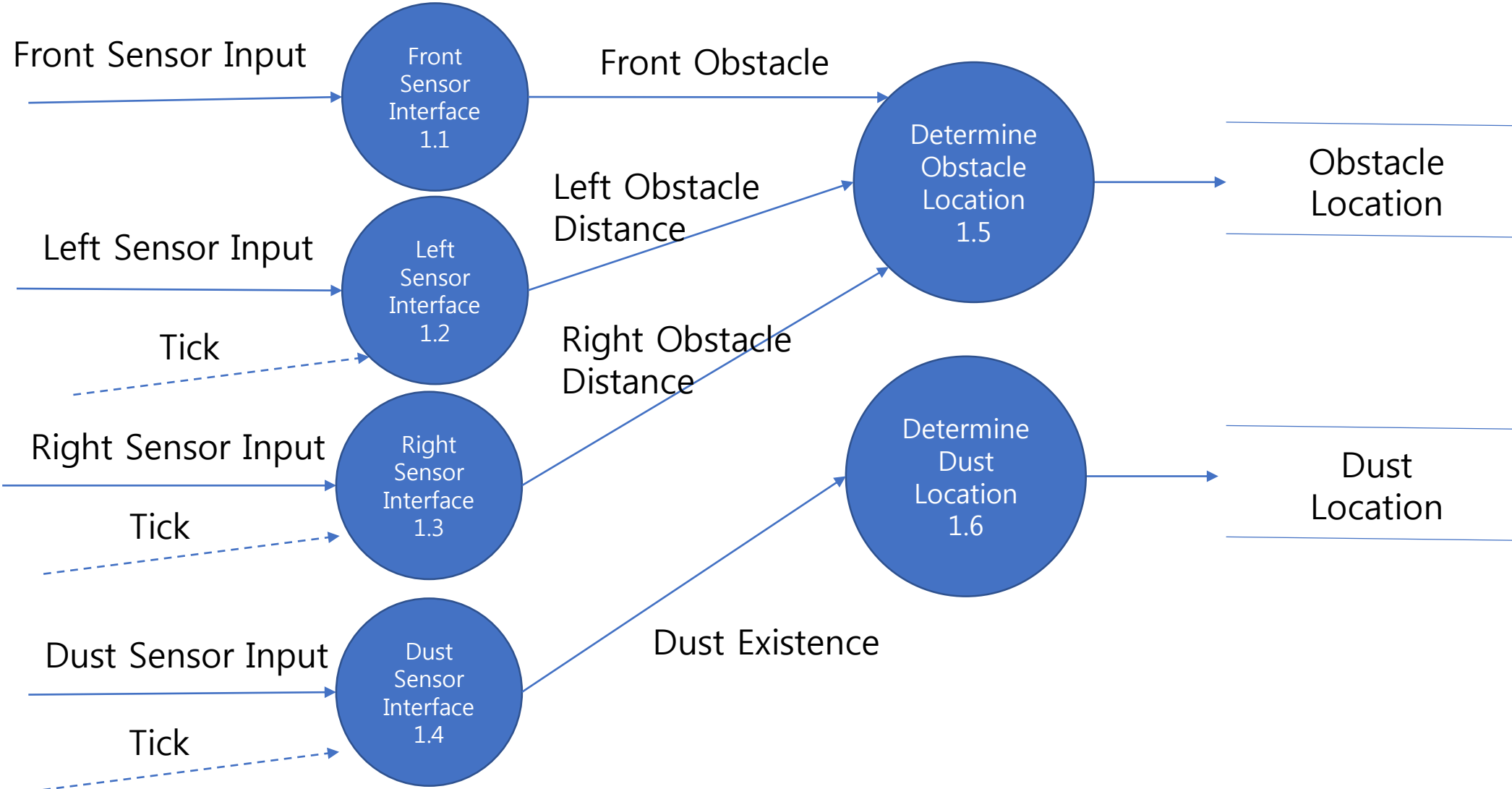
Input / Output Event	Description	Format
Front Sensor Input	Detects obstacles in front of the RVC	True / False, Interrupt
Left Sensor Input	Detects obstacles in the left side of the RVC periodically Detects distance	True / False, Periodic Distance.diameter
Right Sensor Input	Detects obstacles in the right side of the RVC periodically Detects distance	True / False, Periodic Distance.diameter
Dust Sensor Input	Detects dust on the floor periodically	True / False, Periodic
Direction	Direct commands to the motor (go forward / turn left with the angle / turn right with the angle / turn a straight angle(turn left or right twice) /stop)	Forward / Left / Right / Turn Back / Stop
Clean	Turn off / Turn on / Power-up	On / Off / Up



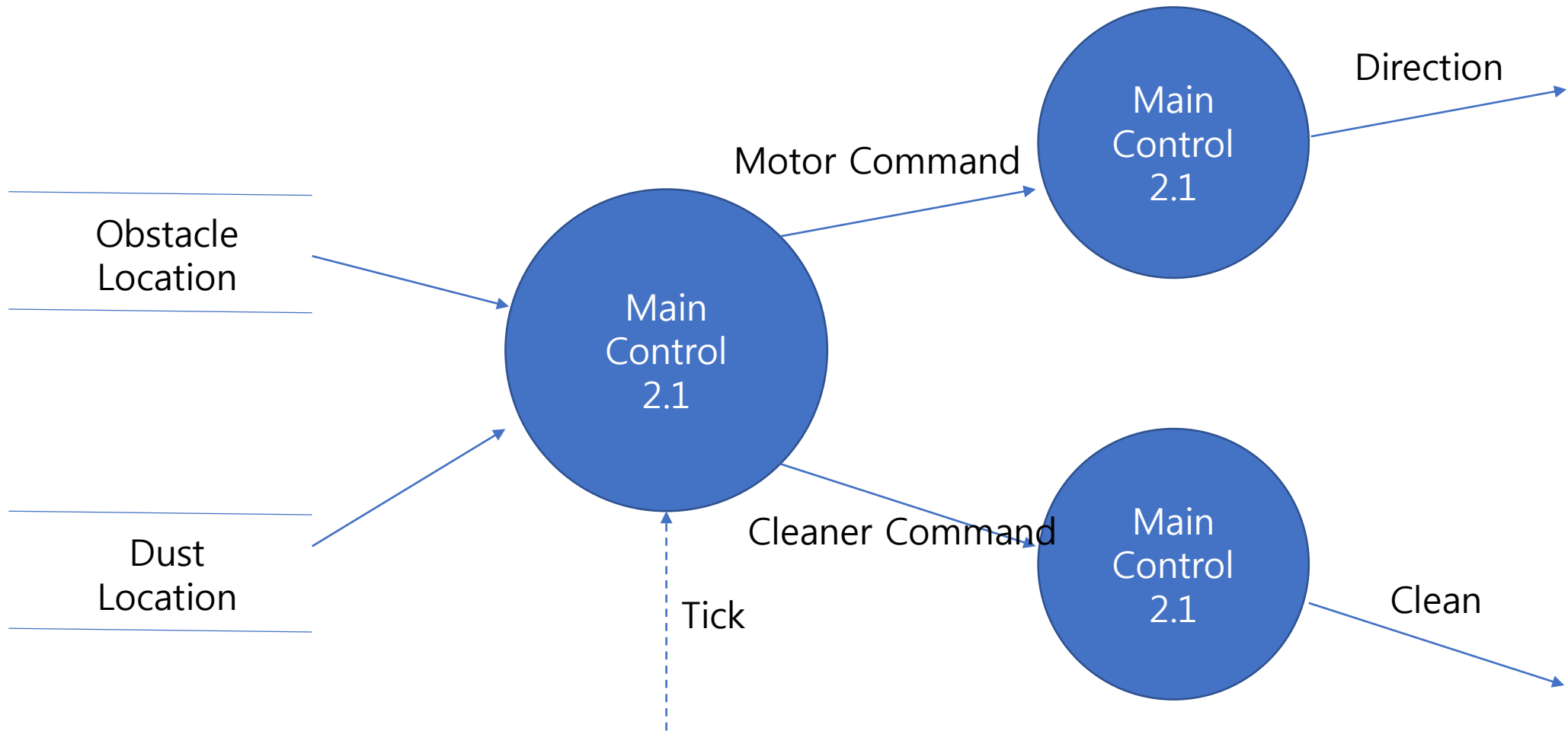
# DFD Level 1 - RVC



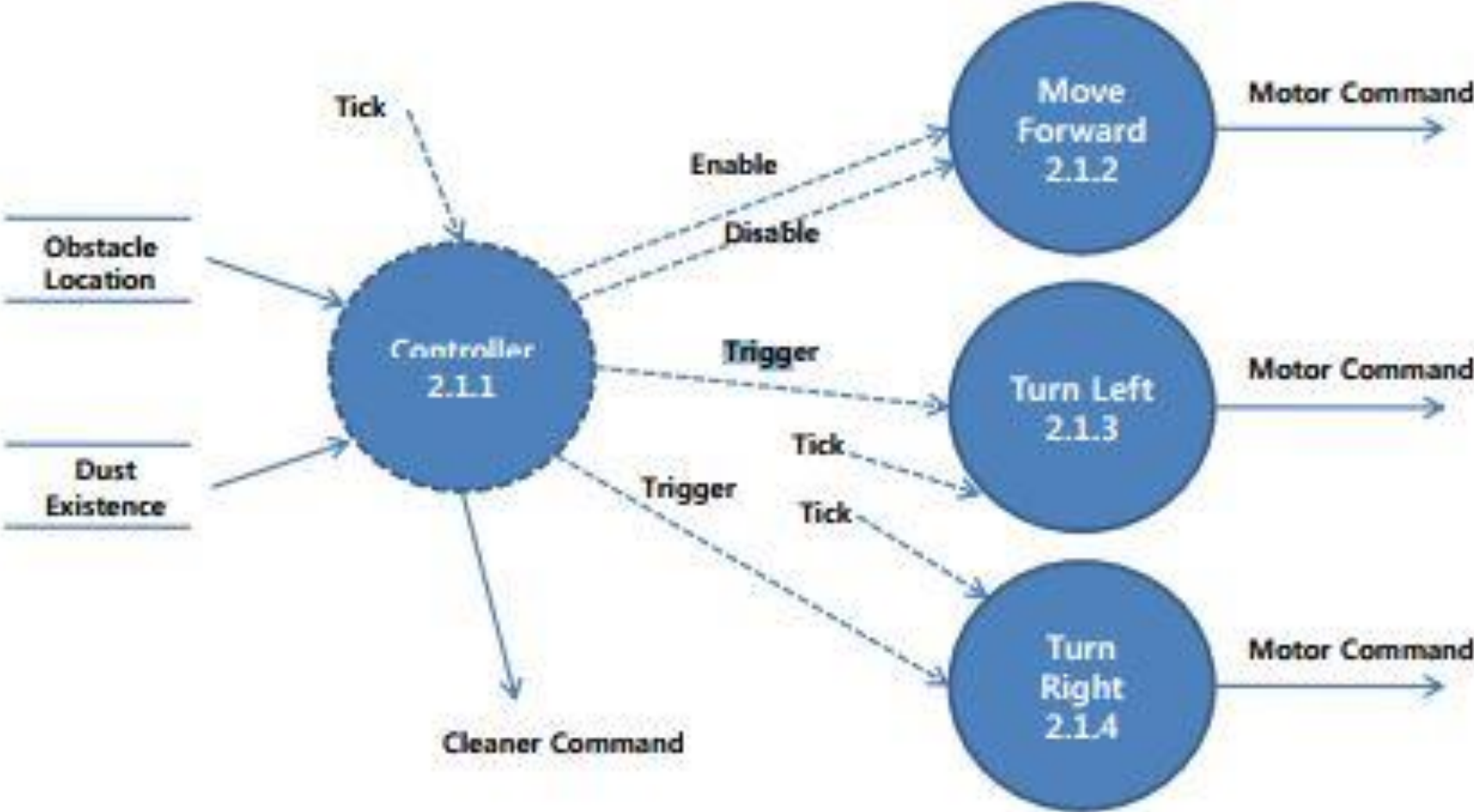
# DFD Level 2 - RVC



# DFD Level 2 - RVC

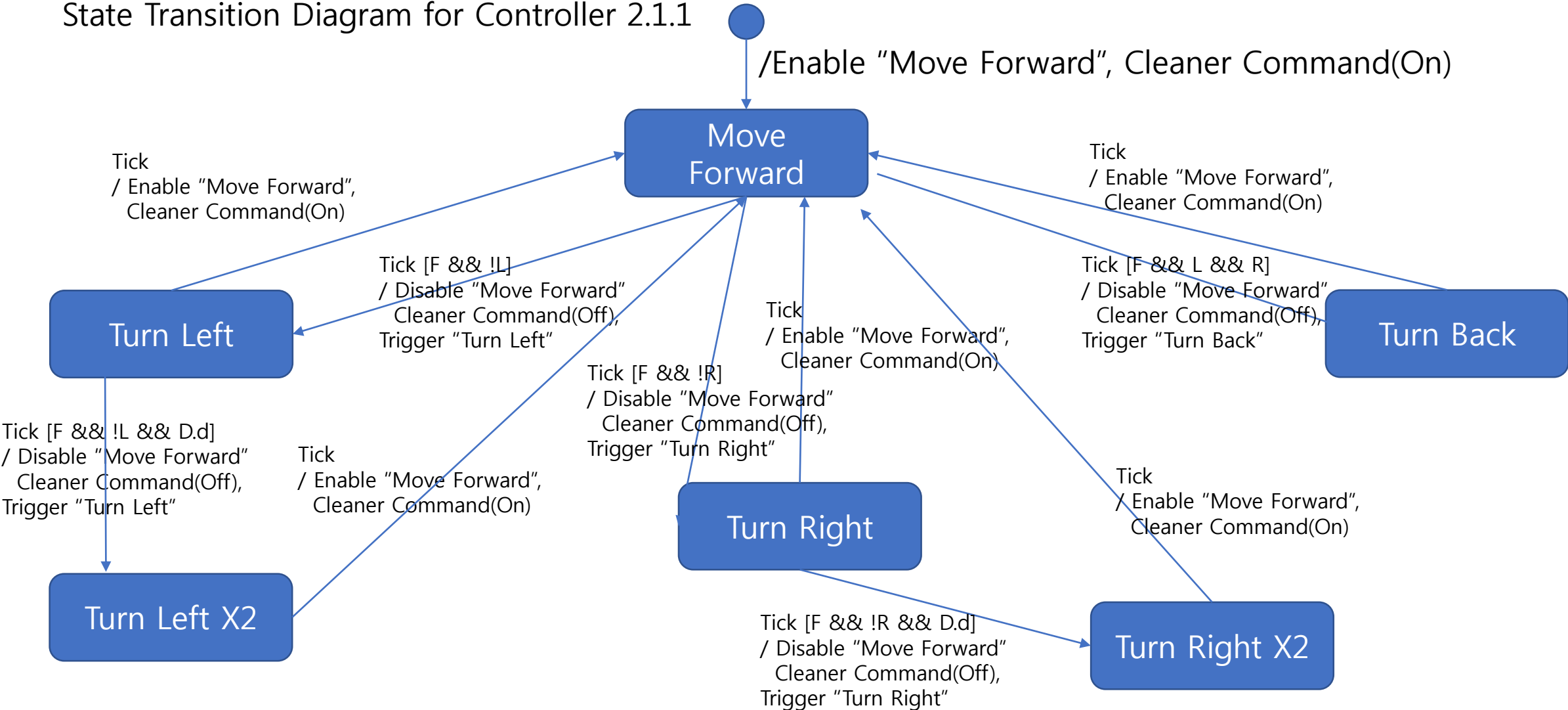


# DFD Level 3 - RVC



# DFD Level 4 - RVC

State Transition Diagram for Controller 2.1.1



# Modifications

- "Turn Back" instead of stop when the RVC meet 3side obstacle location.
- Turn left or right twice after turn and move forward about distance of diameter so that the RVC can clean rectangle shape room perfectly by moving " $\cong$ " shape.

# Problems

- It didn't consider about other shape of rooms out of rectangular room. (cf. circular room)
- It didn't consider about battery sensor.