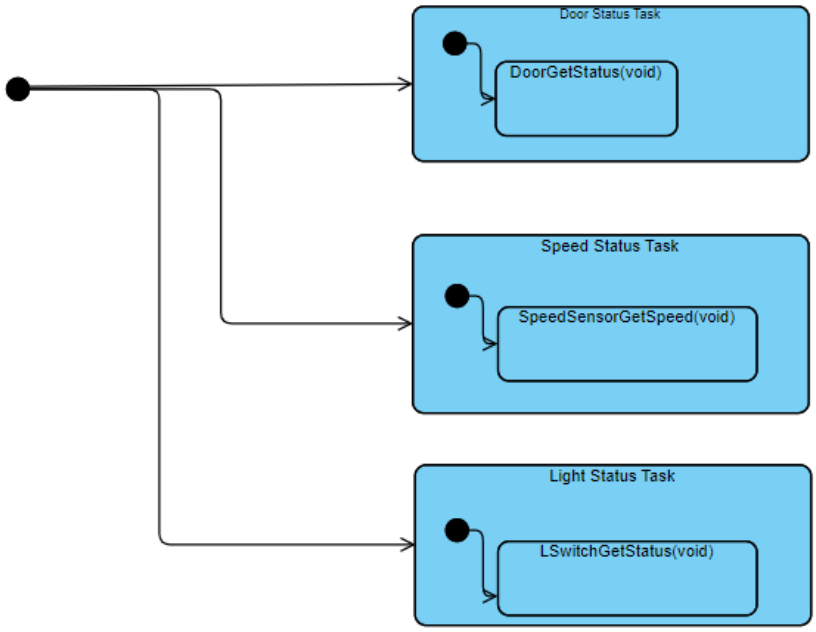
Automotive door control system design

Prepared by: Tarek Wael

[2] Dynamic Design Analysis:

1)State machine diagram:

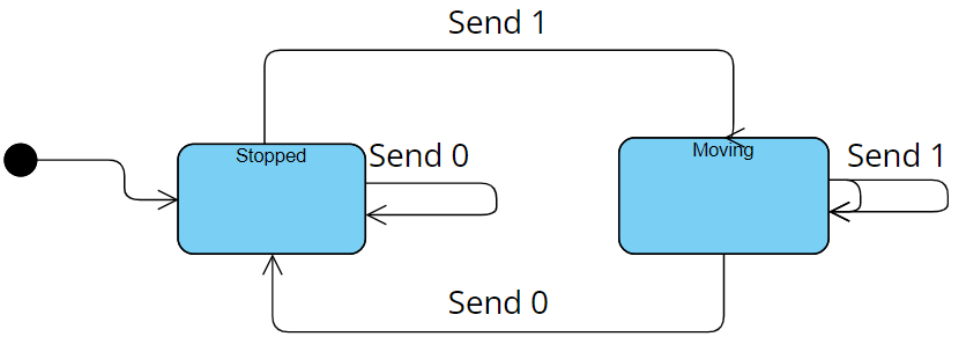
ECU 1:



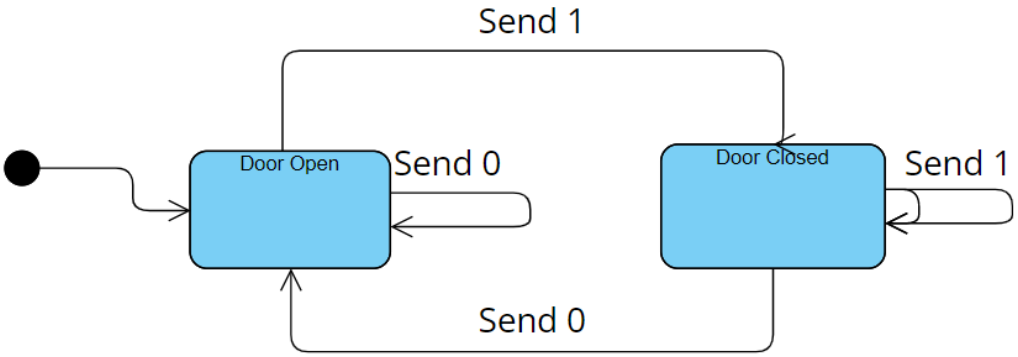
- An event flag containing all 3 status is sent via CAN bus to ECU 2 every 5 ms

2)State machine diagram for ECU components:

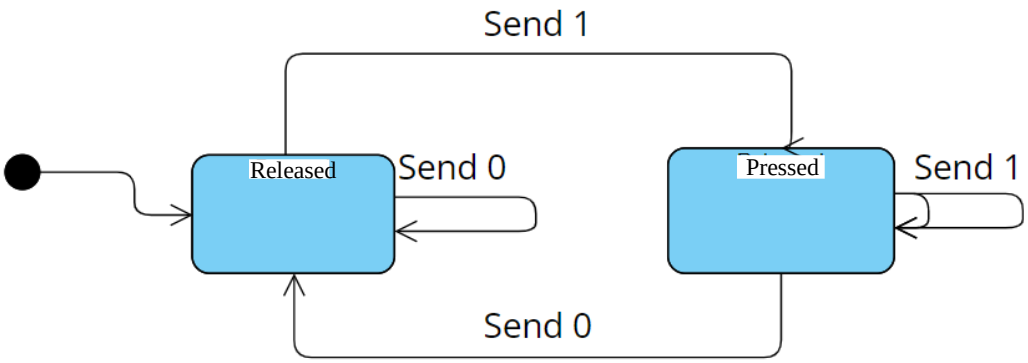
Speed Sensor Module



Door Sensor Module



Light Switch Module



3) CPU Load

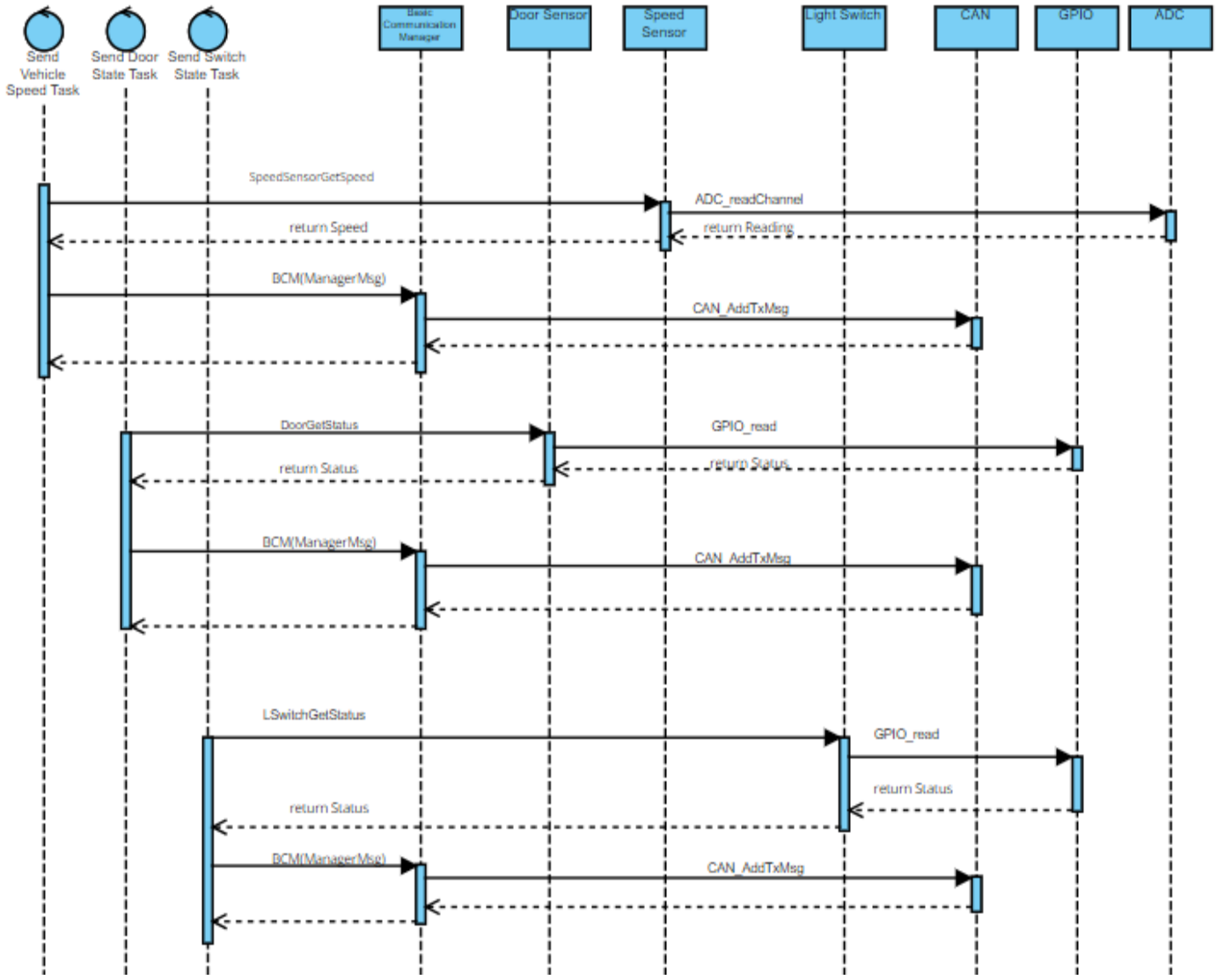
T1{P:20, E:1,D:20} **T2{P:10, E:1,D:10}** **T3{P:5, E:1,D:5}**

- ***Hyper Period*** = 20 ms

- U = (E1 + E2 +E3)/H = ((1+(1*2)+(1*4))/20) * 100 = 35 %

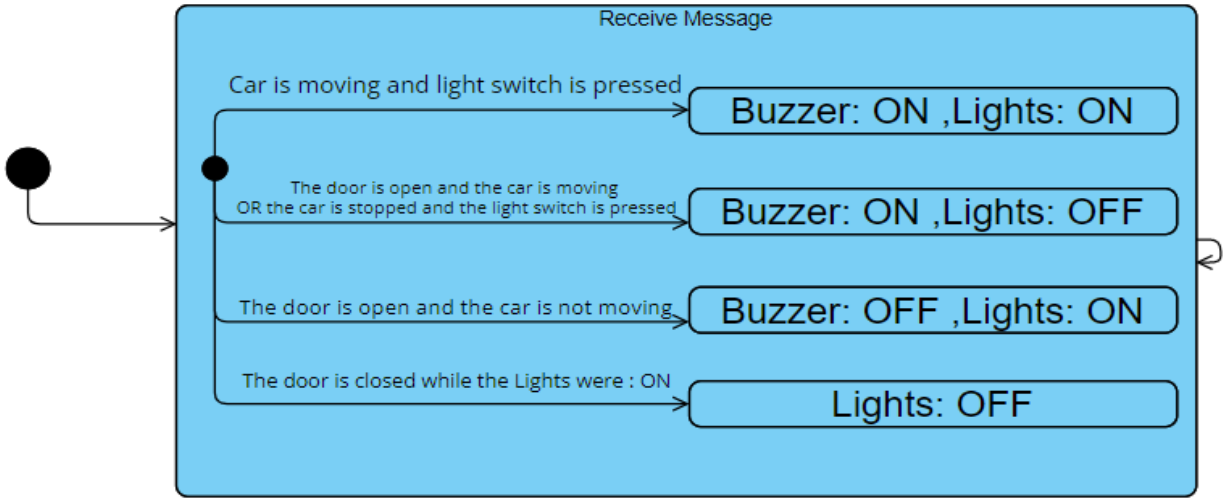
- Execution time was assumed to be 1 ms for all tasks

4) Sequence Diagram

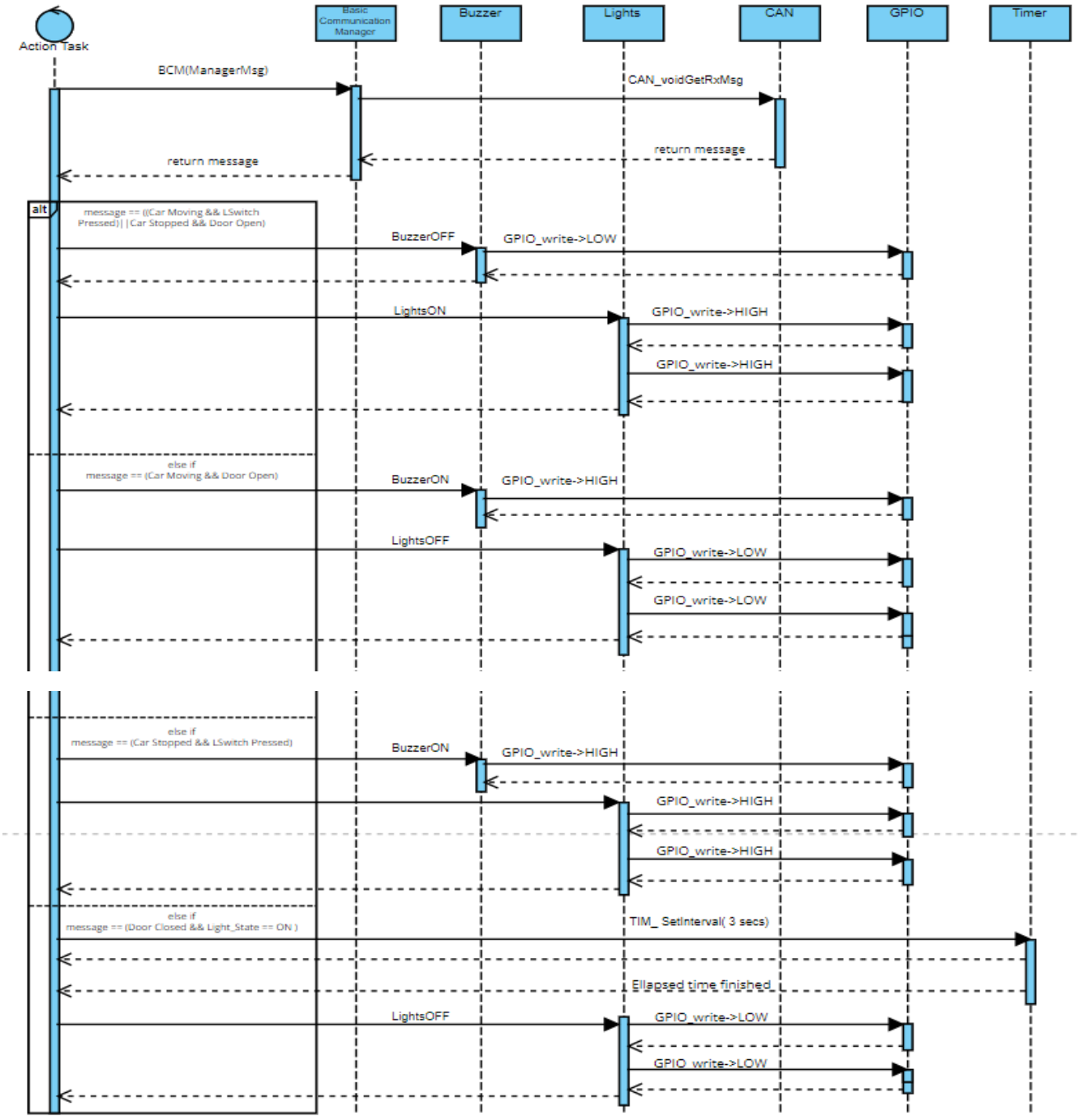


ECU 2:

1)State Machine Diagram



2) Sequence Diagram



3) CPU Load

T1{P:5, E:2,D:5}

- ***Hyper Period*** = 5 ms

- U = E1/H = (2/5) * 100 = 40 %

- Execution time was assumed to be 2 ms.