FWD – Advanced Embedded Systems Course
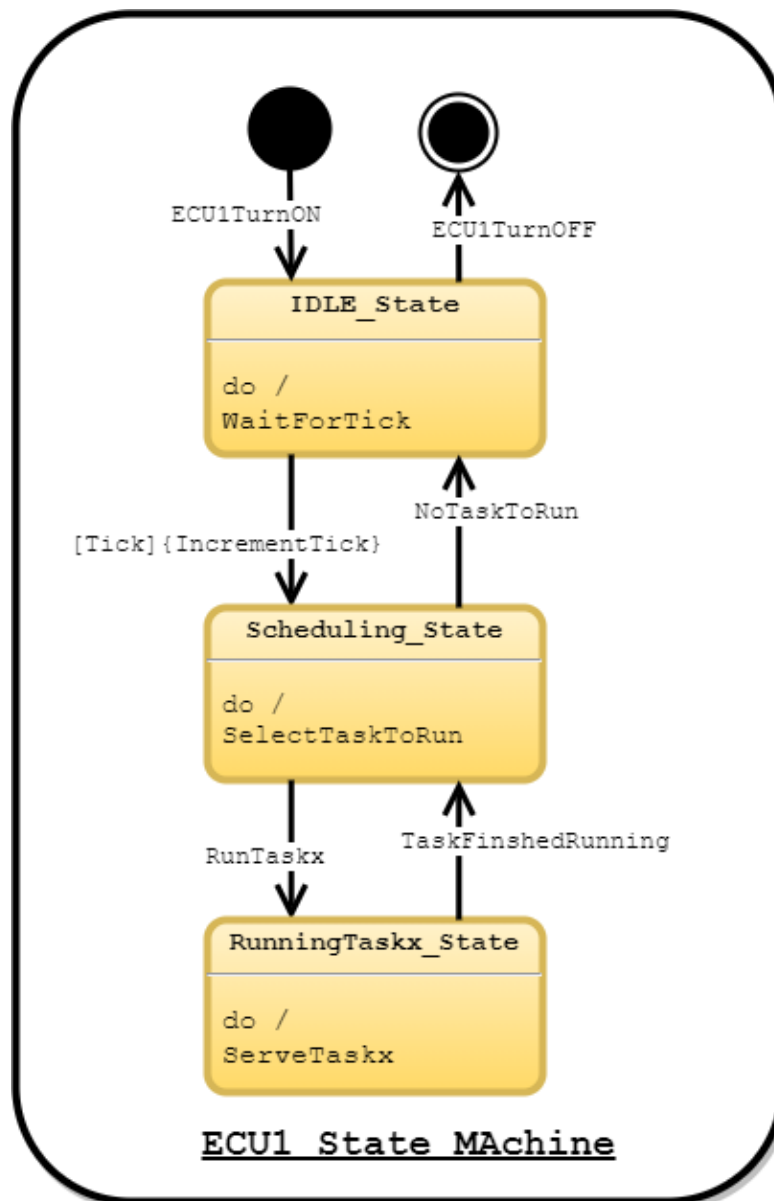## Project #3 – Embedded Software Design

1st : Fully Dynamic Design.

❖ **Dynamic design analysis:**
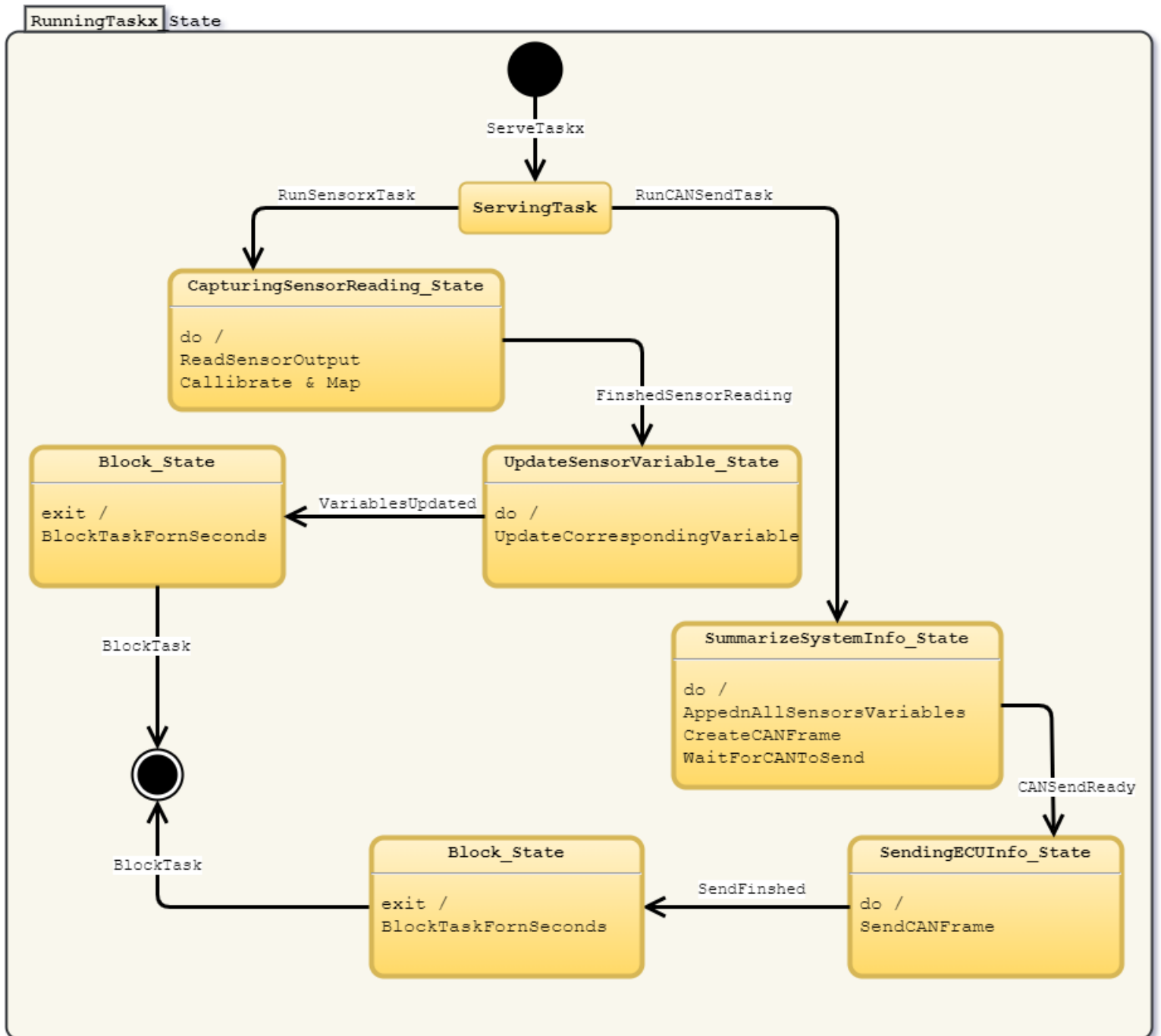
➢ **ECU1 State Machine Diagram**

   o **ECU1 Operation**

ECU1 runs RTOS to handle all tasks:
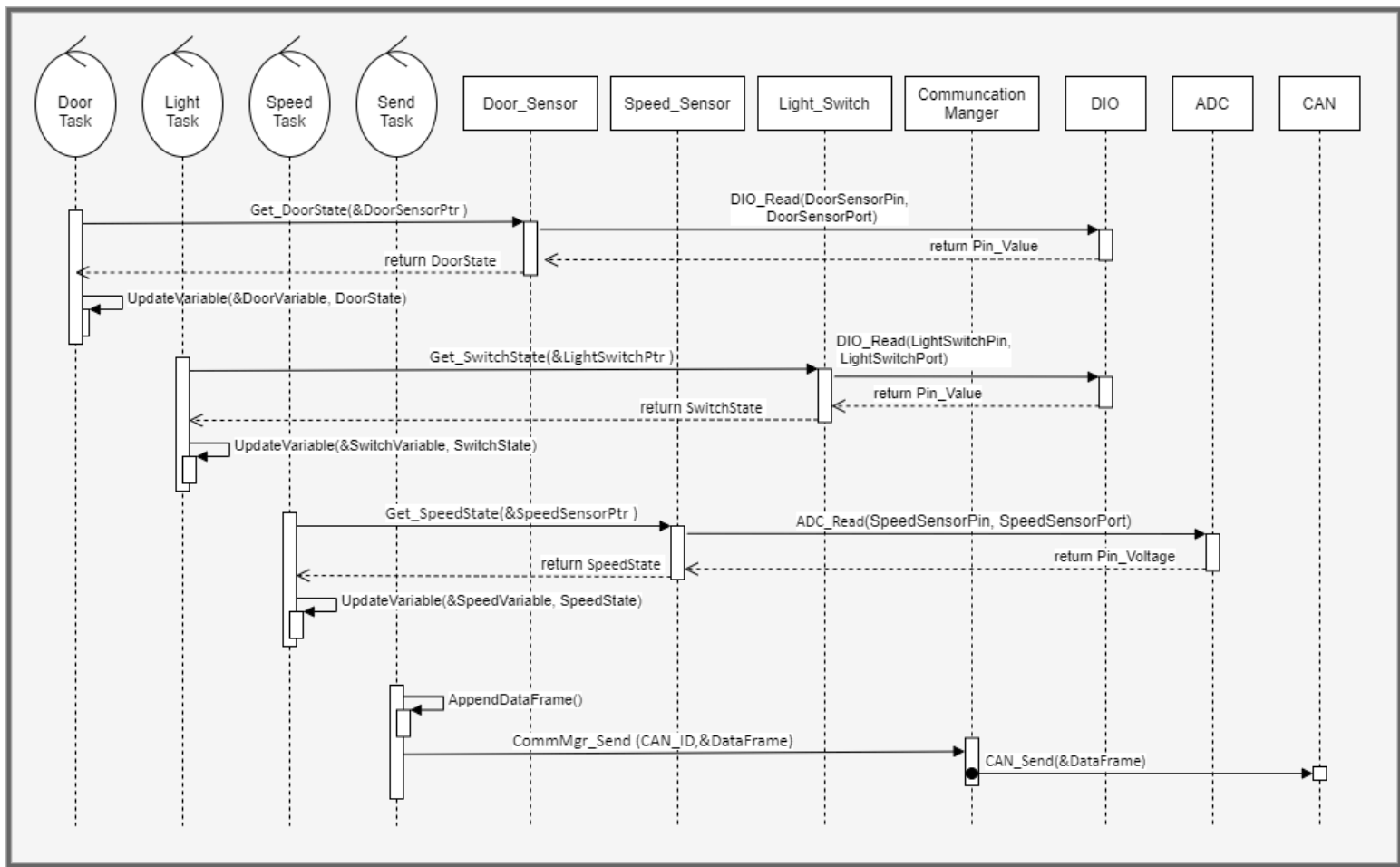
ECU1 Tasks states (RTOS Tasks) are composite states from the ECU Operation "RunningTaskx_State" State, ECU1 Tasks are two types, first the tasks serving the sensors/switch with same operation algorithm and summarized under "RunSensorxTask" Condition branch, second the Sending task under "RunCANSendTask" Condition branch:
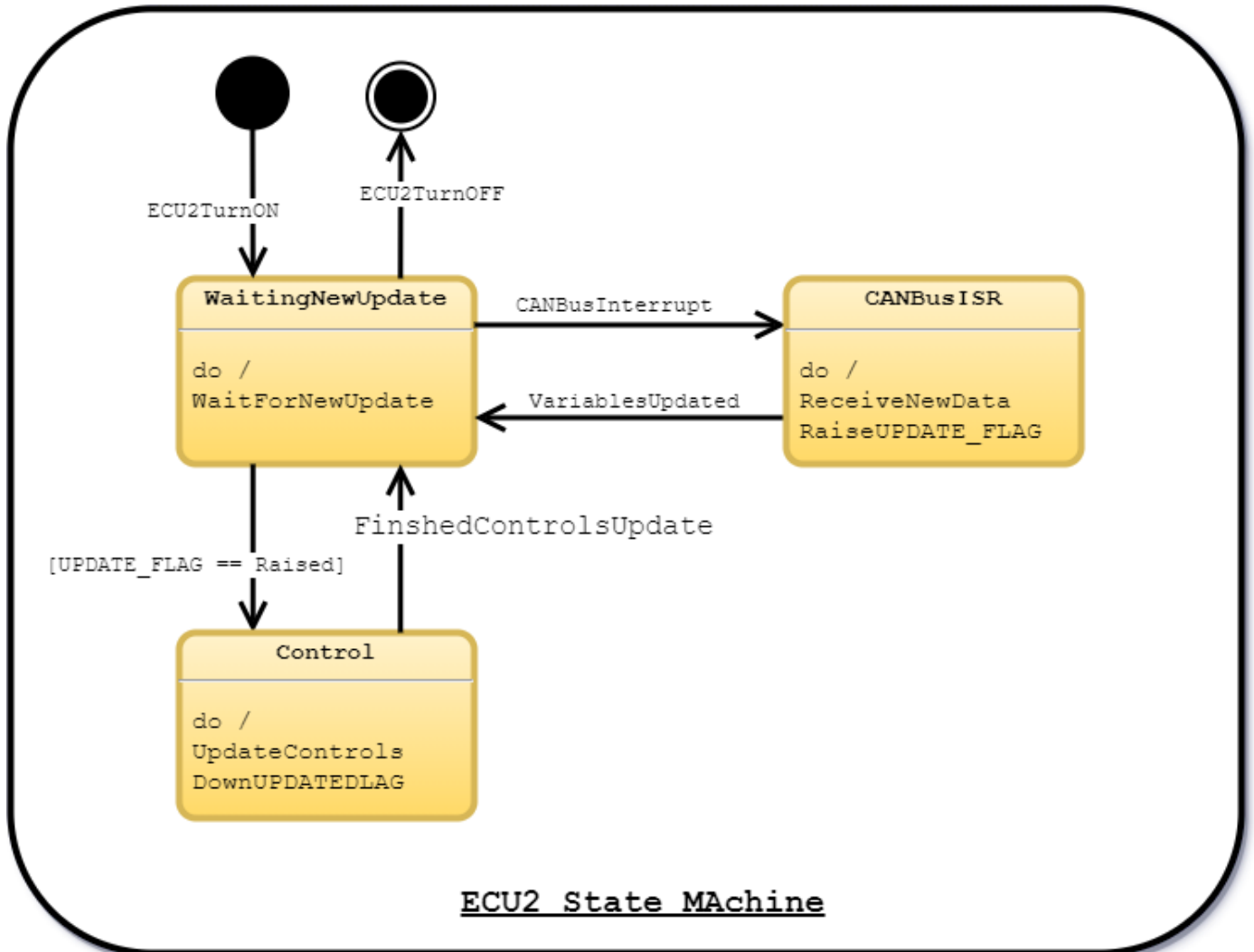
ECU1 Sequence Diagram

- **ECU1 CPU Load**

- ➢ **ECU2 State Machine Diagram**
 - o **ECU2 Operation**

ECU1 Runs an Event-Triggered Architecture to immediately receive ECU1 updates vis CAN Bus and then update the control applied on ECU2 attached components (Lights/Buzzer):
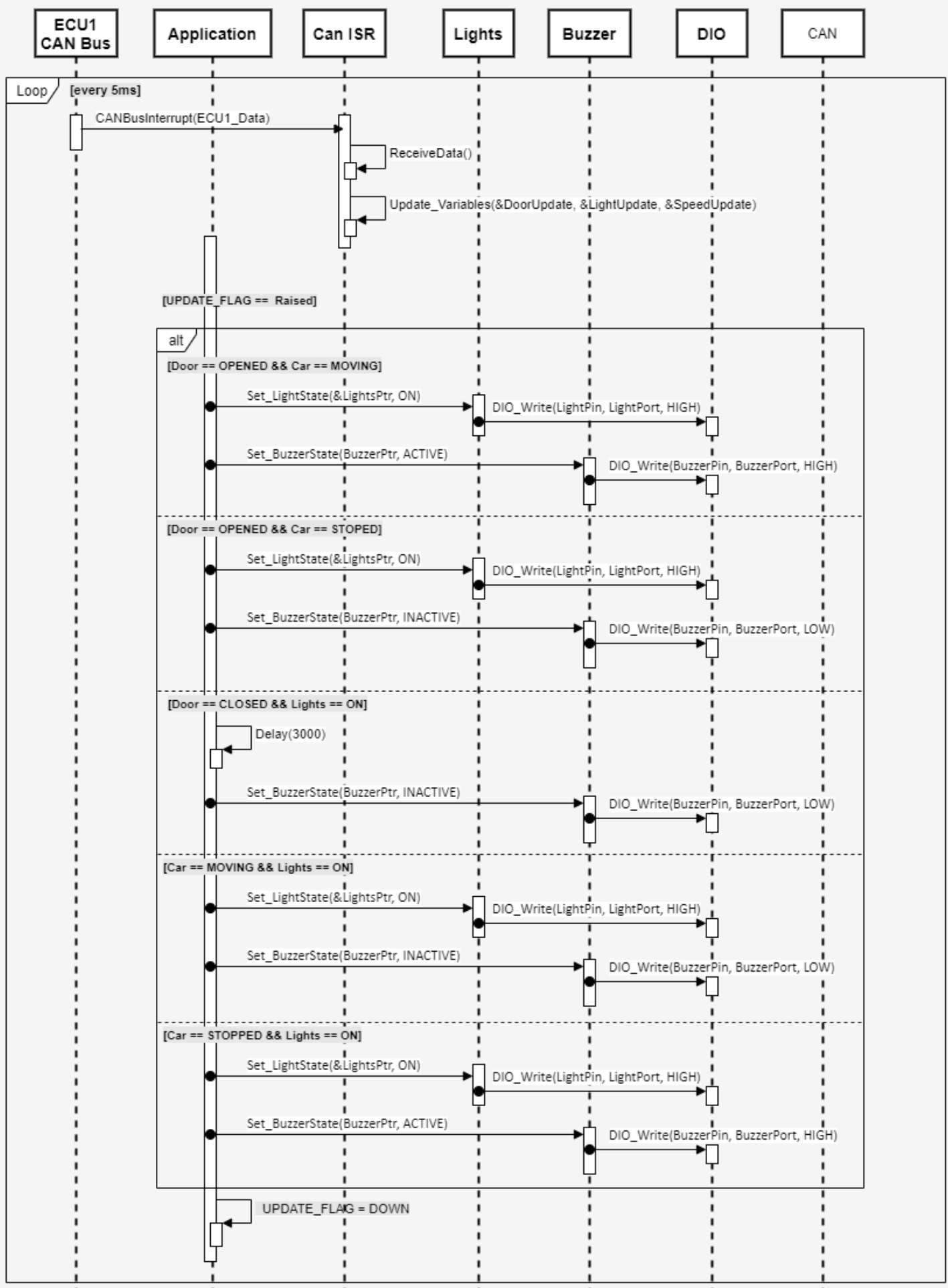

ECU2 State MAchine

○ **ECU2 Components State Machine**

Control is a composite state to control Lights/Buzzer according the required logic:

If the door is opened while the car is moving → Buzzer ON, Lights OFF
If the door is opened while the car is stopped → Buzzer OFF, Lights ON
If the door is closed while the lights were ON → Lights are OFF after 3 seconds
If the car is moving and the light switch is pressed → Buzzer OFF, Lights ON
If the car is stopped and the light switch is pressed → Buzzer ON, Lights ON
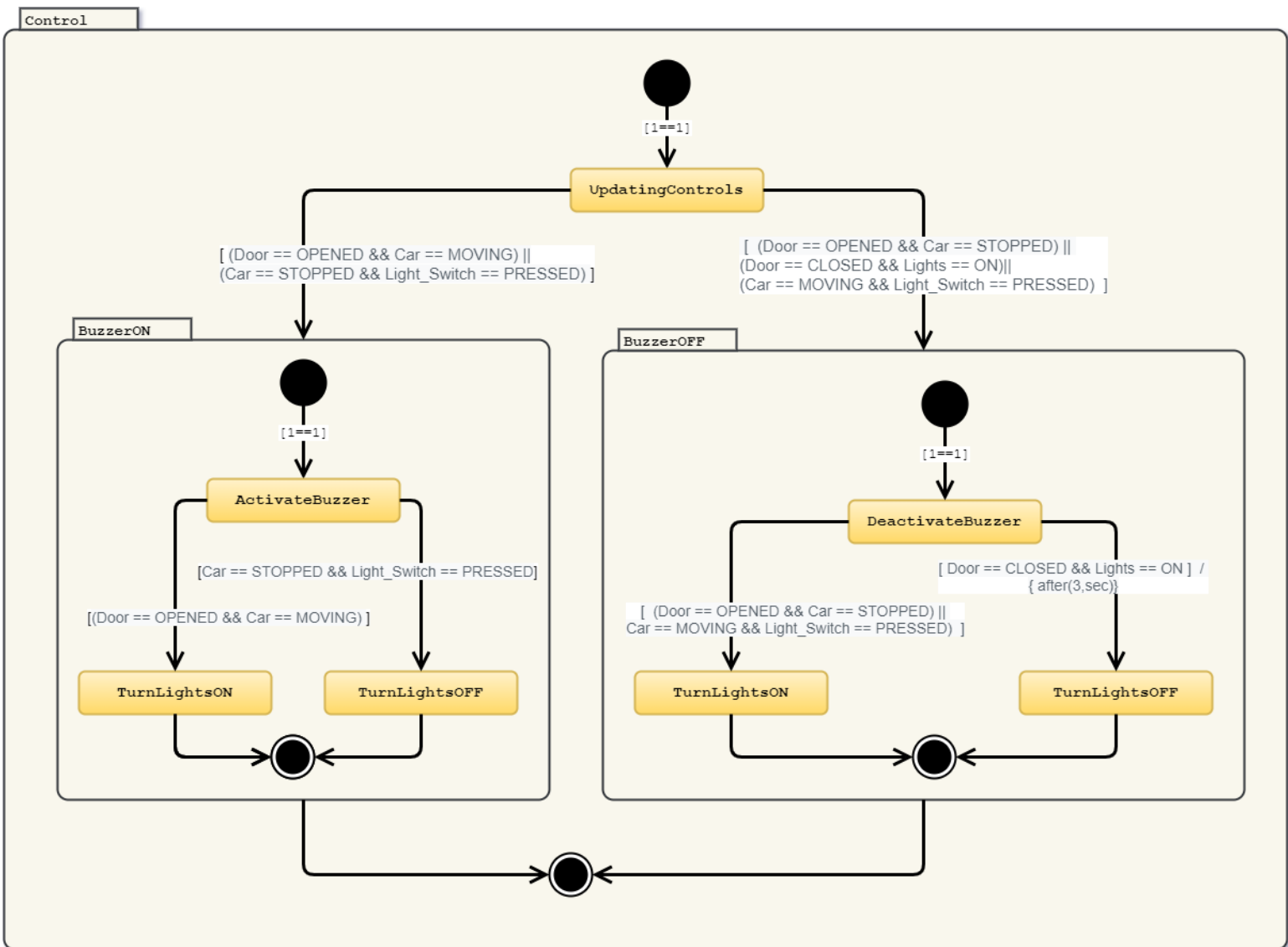
➢ ECU2 Sequence Diagram

- **ECU2 CPU Load**