

ACTUAL SYSTEM

01

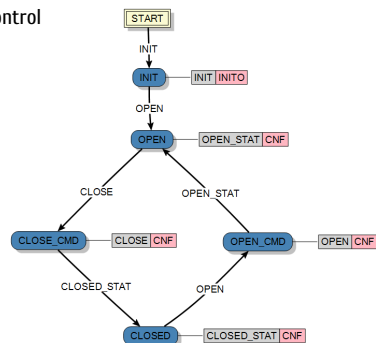
Horizontal Handling Machine (HHM)



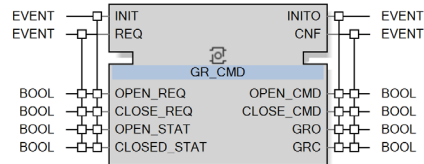
SYSTEM MODEL

02

Execution Control Chart (ECC)

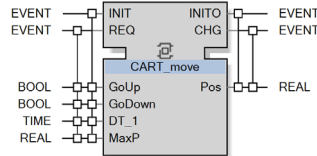


Function Blocks (FBs)

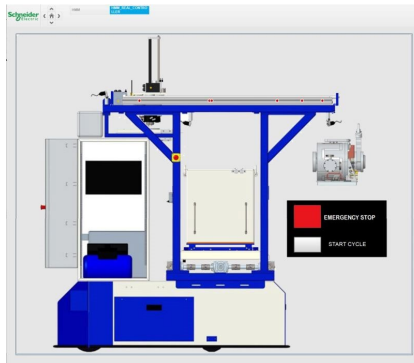


ONLINE SIMULATION

03



Composite Automation Type (CAT)



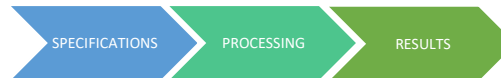
FORMAL VERIFICATION

04

FB2SMV Conversion



NuSMV verification



Output trace

```

Output to file: spec1.txt
elapsed: 18517.71 seconds, total: 18517.83 seconds

-- specification G ! (HHM_FV_PART_1_2_3_inst.
  Elplant.POS_OUT = 5) is true
  
```

VISUALIZATION

05

Counterexample

```

=> State: 3.62 <-
HHM_FV_inst.Elplant.NDT = TRUE
HHM_FV_inst.Crcmd.NA = 0
HHM_FV_inst.Crcmd.NI = 1
HHM_FV_inst.Grplant.NDT = TRUE
HHM_FV_inst.Crcmd_CNF = TRUE
HHM_FV_inst.omega = FALSE
HHM_FV_inst.Elplant.ExistsInputEvent = TRUE
HHM_FV_inst.Crcmd.event_CNF_set = FALSE
HHM_FV_inst.Grplant.ExistsInputEvent = TRUE
  
```

Visualization tool

Step	HHM_FV_inst.Crcmd.moving	HHM_FV_inst.Elplant.POS_OUT	HHM_FV_inst.Elplant.NDT	HHM_FV_inst.Crcmd.NA	HHM_FV_inst.Crcmd.NI	HHM_FV_inst.Grplant.NDT	HHM_FV_inst.Crcmd_CNF	HHM_FV_inst.omega	HHM_FV_inst.Elplant.ExistsInputEvent	HHM_FV_inst.Crcmd.event_CNF_set	HHM_FV_inst.Grplant.ExistsInputEvent
647 prefix	FALSE	4	TRUE	2	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	TRUE
648 prefix	FALSE	4	TRUE	2	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	TRUE
649 prefix	TRUE	4	TRUE	2	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	TRUE
650 prefix	TRUE	4	TRUE	2	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	TRUE
651 prefix	TRUE	4	TRUE	2	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	TRUE