THE INTERLOCK SYSTEM OF FELICHEM

Ziyu Huang, Yifan Song, Gongfa Liu
NSRL/USTC, CHINA

Ref ID: 25

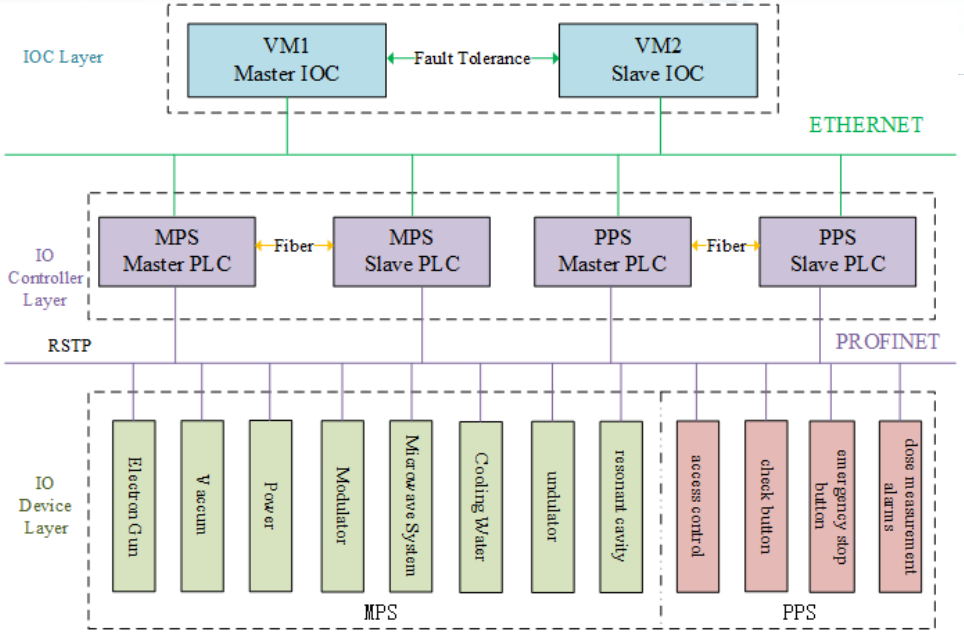
Project Goal

- Overview: FELiChEM has the Hardware Interlock System (HIS) and the Software Interlock System SIS (HIS).

- HIS has 3-layers redundant configuration. It includes IOC layer, PROFINET IO Controller Layer and IO Device Layer.

Project Goal

- Overview: FELiChEM has the Hardware Interlock System (HIS) and the Software Interlock System SIS (HIS).
- HIS has 3-layers redundant configura
  Controller Layer and IO Device Layer



Project Goal

- Overview: FELiChEM has the Hardware Interlock System (HIS) and the Software Interlock System SIS (HIS).

- HIS has 3-layers redundant configuration. It includes IOC layer, PROFINET IO Controller Layer and IO Device Layer.

- SIS is more flexible and configurable than HIS. We use JSON configuration file to define the interlock logic.

Project Goal

- Overview: FELiChEM has the Hardware Interlock System (HIS) and the Software Interlock System SIS (HIS).

- HIS has 3-layers redundant configuration. It includes IOC layer, PROFINET IO Controller Layer and IO Device Layer.

- SIS is more flexible and configurable than HIS. We use JSON configuration

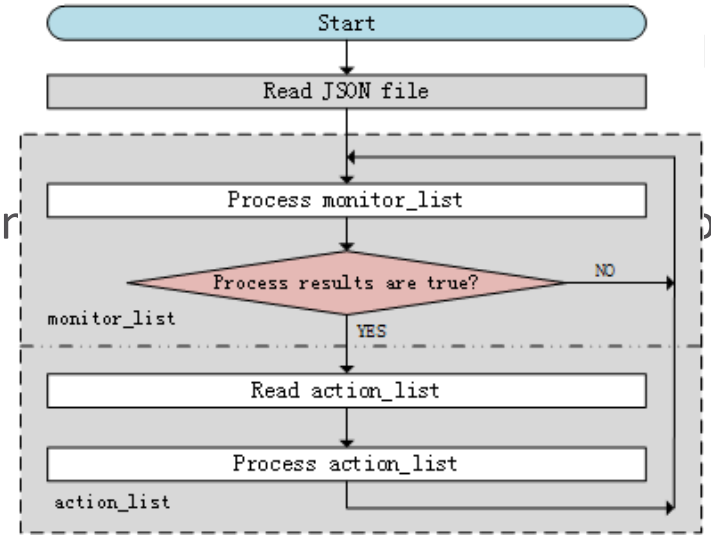
```
{
   "interlock_unit":{
      "monitor_list":[
         { "pv_name":"PV_IN_1","compare_operator":">=","design_value":4},
         { "pv_name":"PV_IN_2","compare_operator":"==","design_value":3}
      ],
      "action_list" : [
         { "action" : "set", "pv_name" : "PV_OUT_1","set_point" : 0 },
         { "action" : "delay", "delay_time" : 5},
         { "action" : "set", "pv_name" : "PV_OUT_2", "set_point" : 0.5 }
      ]
   }
}
```

Project Goal

- Overview: FELiChEM has the Hardware Interlock System (HIS) and the Software Interlock System SIS (HIS).

- HIS has 3-layers redundant configuration. O Controller Layer and IO Device Layer.

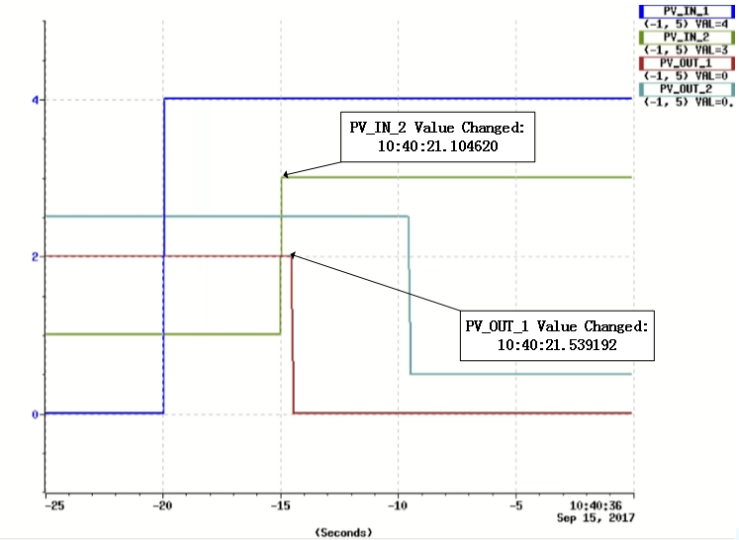
- SIS is more flexible and configurable thar on

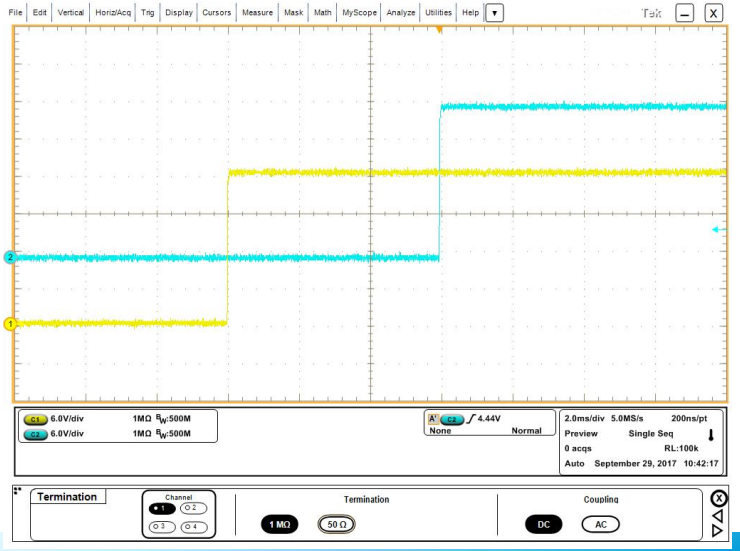



```
{
   "interlock_unit":{
      "monitor_list":[
         { "pv_name":"PV_IN_1","compare_operator":">=","design_value":4},
         { "pv_name":"PV_IN_2","compare_operator":"==","design_value":3}
      ],
      "action_list" : [
         { "action" : "set", "pv_name" : "PV_OUT_1","set_point" : 0 },
         { "action" : "delay", "delay_time" : 5},
         { "action" : "set", "pv_name" : "PV_OUT_2", "set_point" : 0.5 }
      ]
   }
}
```

Solution outline

- We had established a prototype system for test. The response time is about 6ms, and the switch-over time is 6.229ms.For SIS, the response time is 434.572ms.





Solution outline

- We had established a prototype system for test. The response time is about 6ms, and the switch-over time is 6.229ms.For SIS, the response time is 434.572ms.
- The parameters of HIS is much better than requirement.
- SIS is a necessary supplement for Interlock System.
- We can adopt redundant configuration in IOC layer.

Conclusion

- HIS bases on PLC and PROFINET and adopts redundancy configuration.
- We design SIS to increase flexibility which separates interlock program and configuration files.
- FELiChEM will construct from 2017. The interlock control system will also be arranged after the completion of the facility.

Thank you!

Welcome to my POSTER at THMPA01.