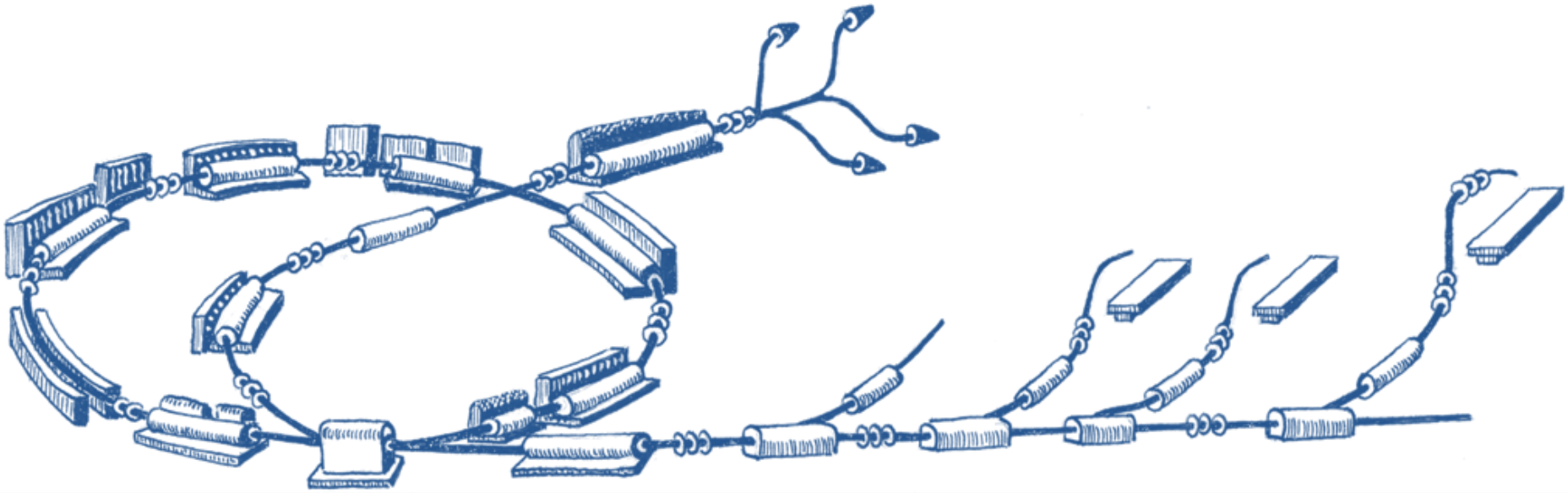
Beam Interlock System



The Beam Interlock System

- Concepts
  - Risk Management
- BIS
  - Scope of the BIS
  - Hardware to be used Used
- Status

CONCEPTS

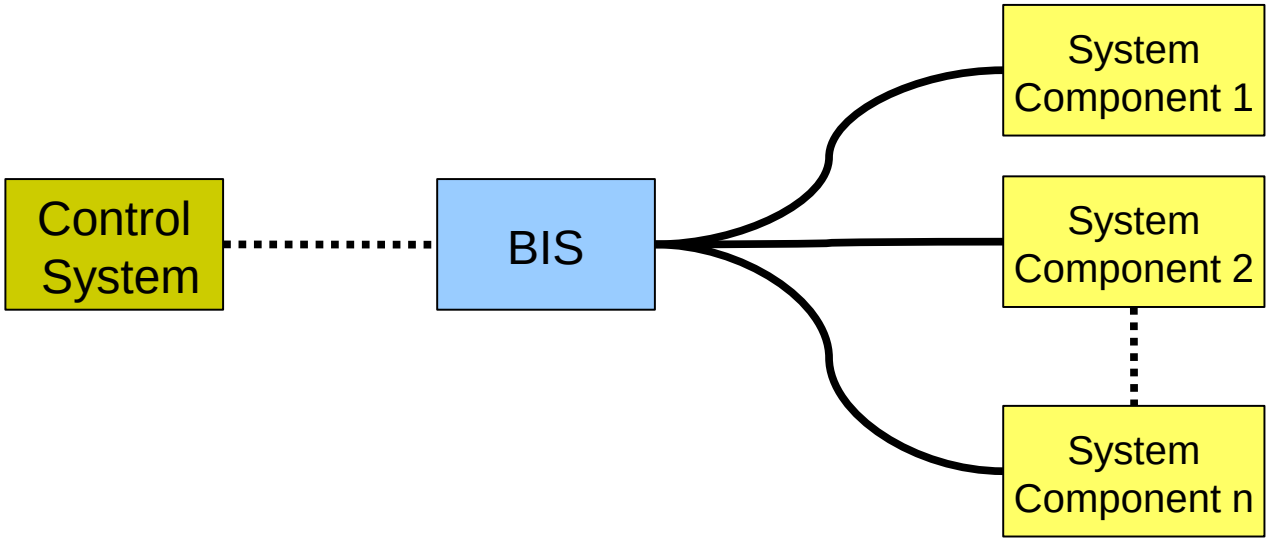
Steps in Risk Management

- Identify, characterize, and assess threats
- Assess the vulnerability to the specific threats and determine the risk
- Identify ways to reduce those risks
- Prioritize and apply risk reduction measures based on a strategy

The Beam Interlock system

What is the BIS

The goal of the Beam Interlock System (BIS) is to improve the operation safety by reducing the risk of harm to health of personnel and patients. For this purpose the system collects interlock signals from a number of subsystems and re-generates interlock signals derived from the acquired signals for re-distribution to all connected subsystems.



Scope Of the BIS

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- The BIS will not add functionality, it will still be possible to operate accelerator without it, yet at a (much) higher risk.
- The BIS is a relatively slow system, maximum reaction times in the order of 200-300 ms
  - **Prevent possible hazardous situations**
- The BIS will act independently of the control system but will be connected to it. So status information can be read at any time through the slow control path.

Hardware to be Used

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Siemens PLCs And Safety I/O Modules

(certified for personnel safety)

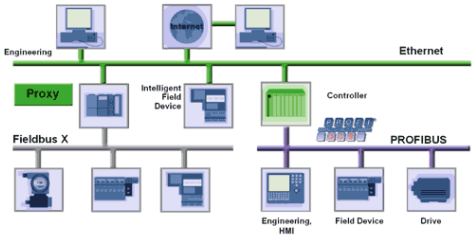
- Reliable, flexible and scalable

Siemens Simatic Safety Matrix

Provides a simple table interface with the Cause&Effect method making safety functions easily created and implemented.

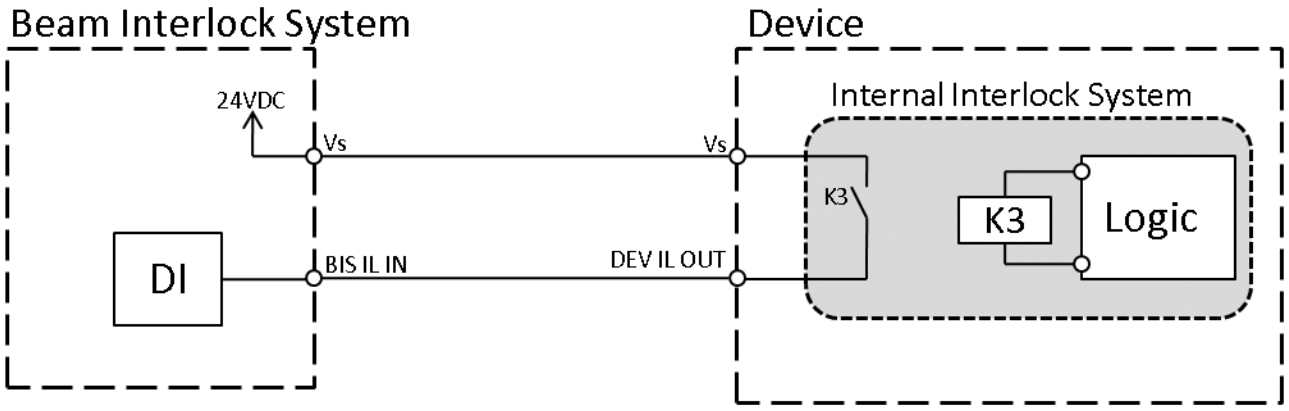
ProfiNet IO network

The PLC will be placed in MedAustron's "data center" hall and the IO modules will be distributed among the control racks.



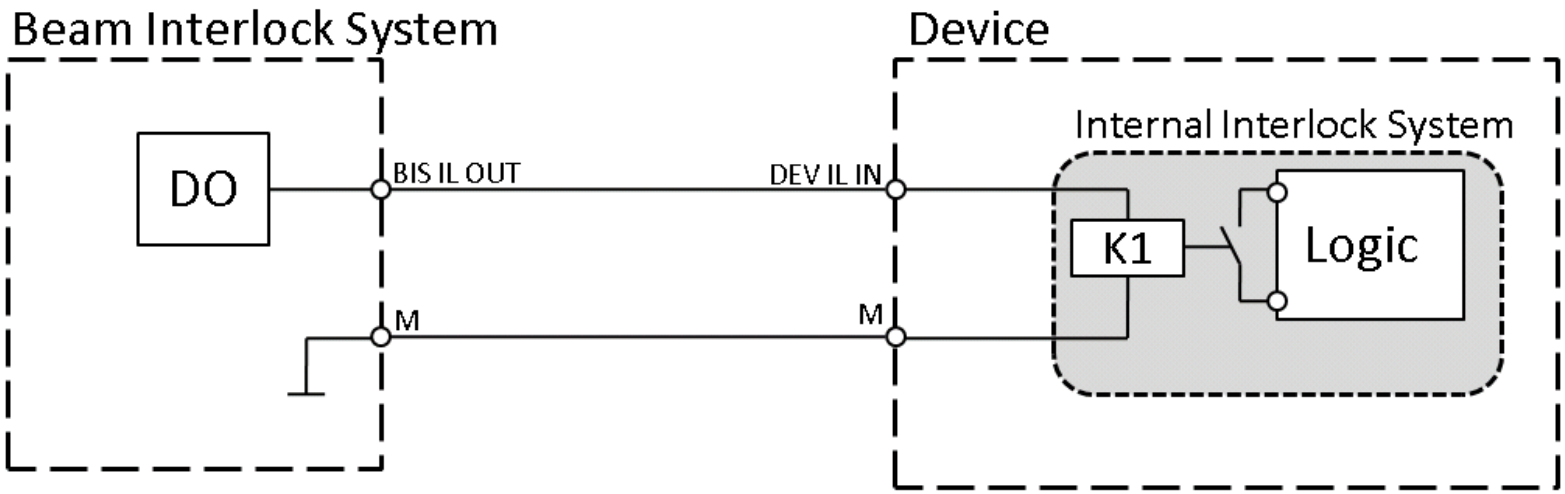
Interface to the BIS

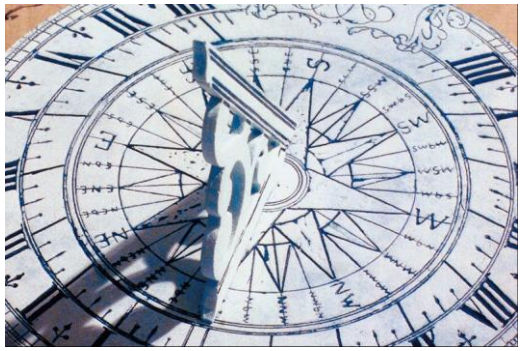
- The BIS will receive “switch” inputs
  - **2 wire** binary signal, electrically separated from the device interlock logic
  - **Closed switch** means the device is in **operational** state
  - **Open switch** means the device is **not** in **operational** state



Interface to the BIS

- The BIS will supply a 24 “relay” output
  - Binary signal capable of driving a relay .
  - 24V means everything is ok.
  - 0V means device has to go to “safe” state.





Status

List Of Inputs/Outputs

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System	devices	Inputs	Outputs
Beam Instrumentation	122	122	12
Power converters	272	272	272
Vacuum	15	15	0
Magnets	267	536	267
Sources	20	20	4
Radio Frequency	4	4	4
infrasstructure	58	58	7
Med. Technical Eq.	34	34	26
Total	792	1061	592

Status

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Done since last MACS week

- Requirements document was sent and reviewed (currently in version 0.5)
- Many comments were collected and incorporated

Till next MACS week

- Some changes with the Interface with the Building Safety Management System (SMS) need be incorporated.
- Feed through of the cables needs to be reviewed
- Interface between BIS and the control system can start to be defined.