Control Command Overview
GBAR Collaboration Meeting

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Control Command

Recommendations

Design Needs

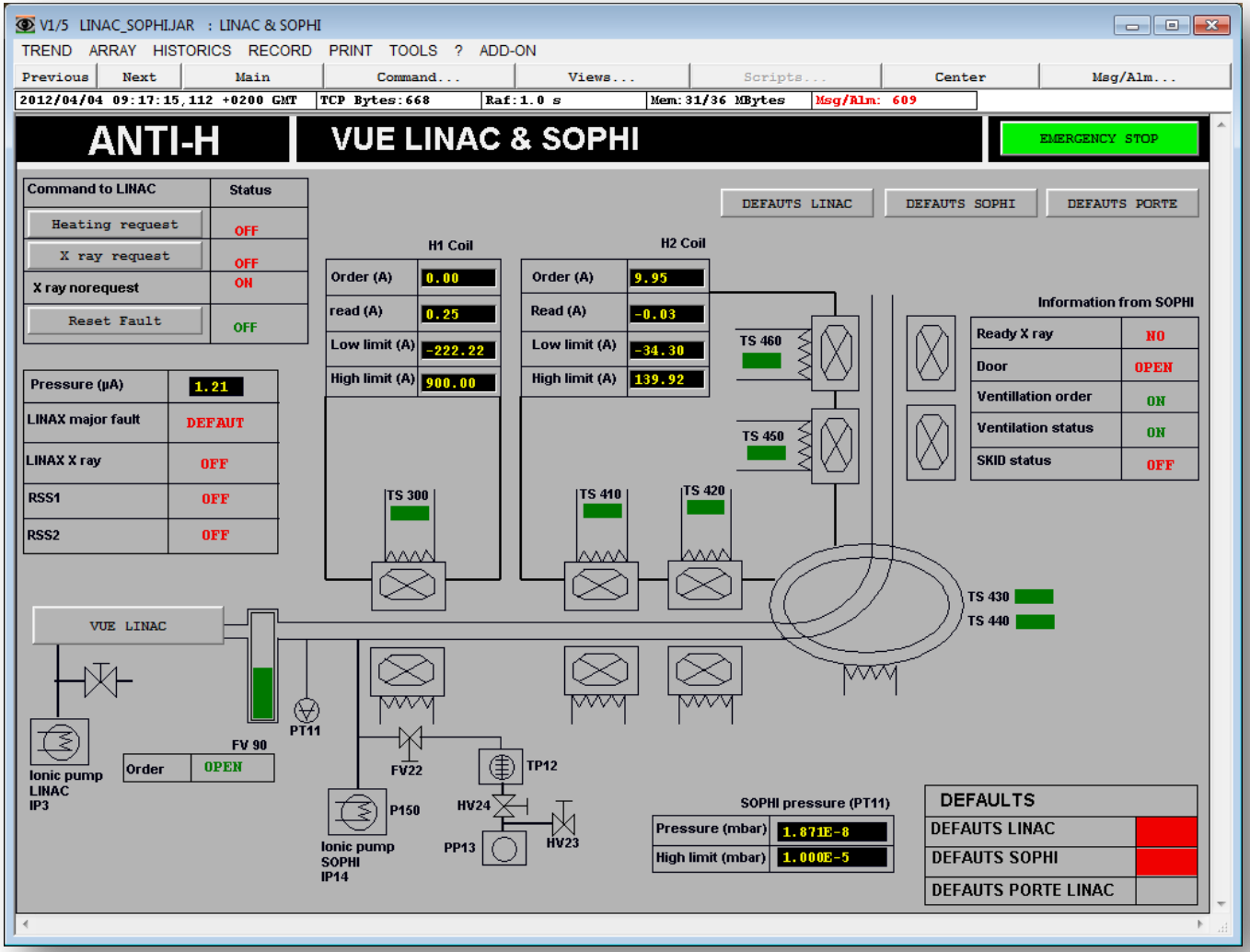
Gbar control command overview

- Integrated control command functions:
  - Global overview
  - Automation (measures, procedures)
  - Safety
  - Alarm
  - Archive and shared data
  - Communication with ELENA
  - Remote debug
  - Time

Gbar control command overview

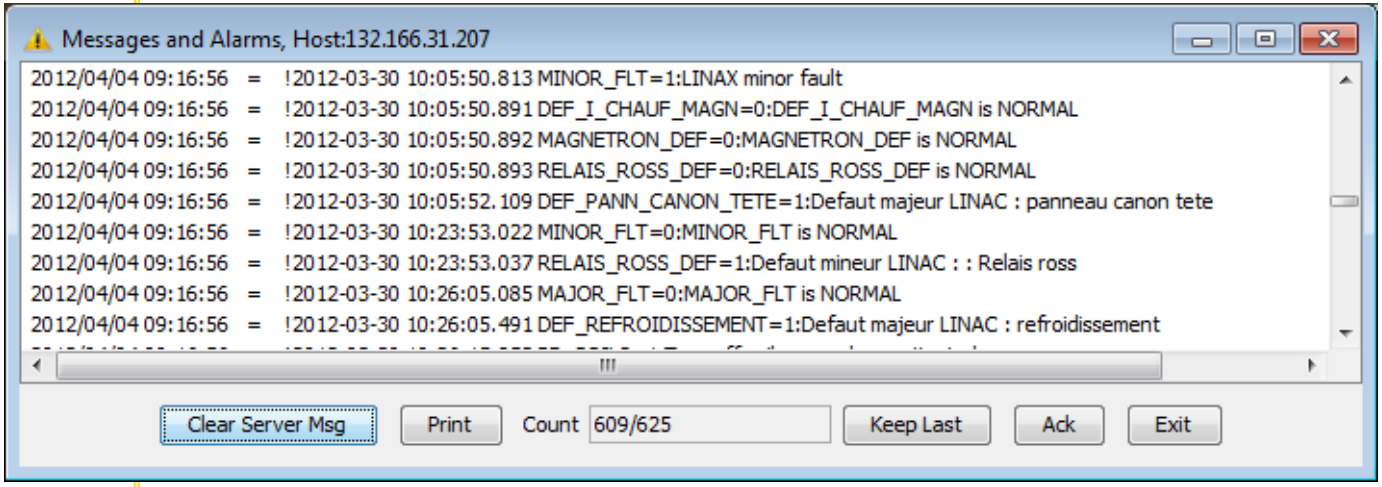
Supervision

Operational overview



Gbar control command overview

Data storage



Error identification and safety issues

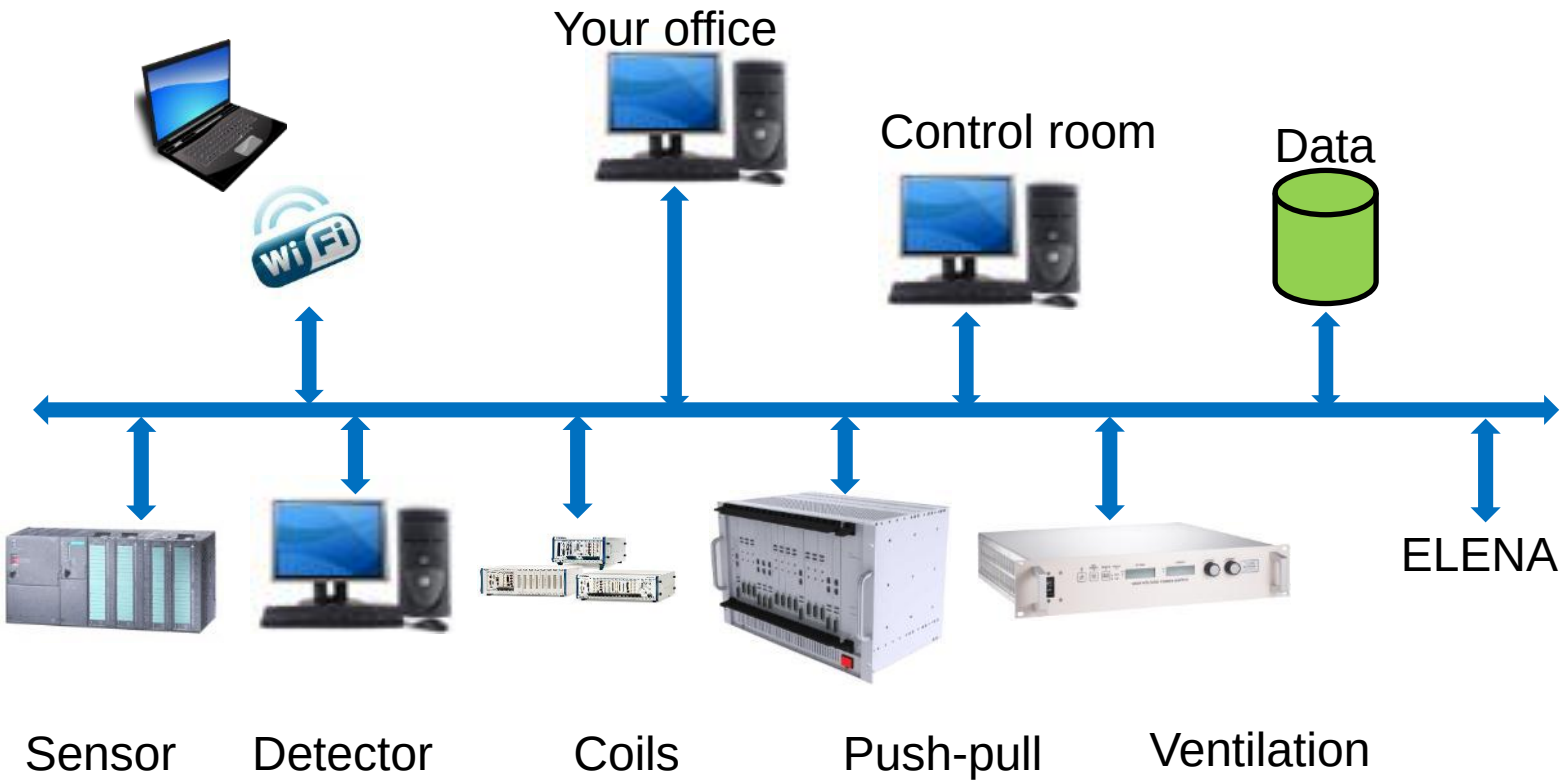
Gbar control command overview

- 2 hardware worlds:
  - Slow control: vacuum, push-pull, coils

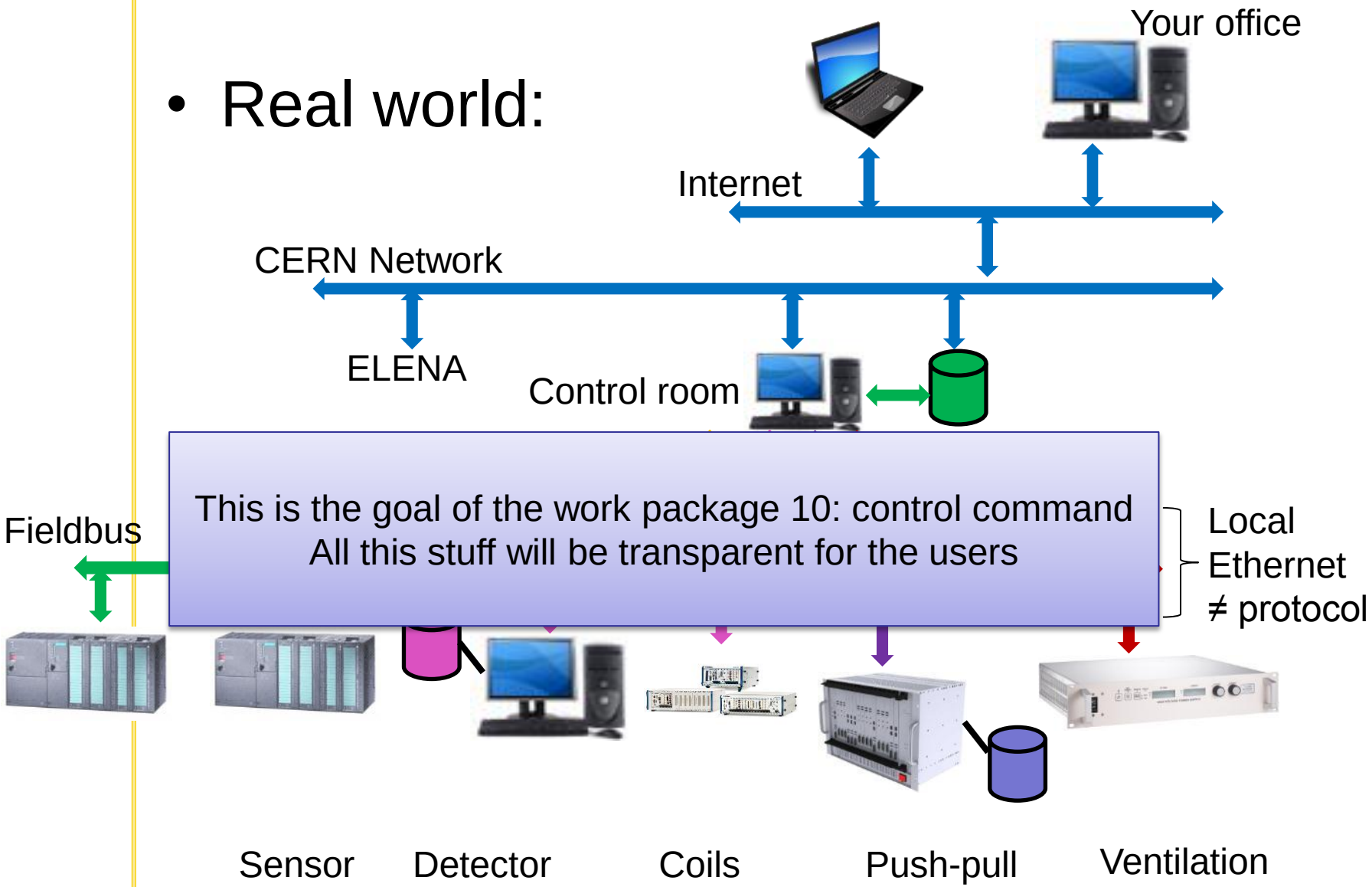
    - PLC (Programmable Logic Controllers): robust, modularity, long term, industrial

- Fast control (DAQ): MCP, …
  - PC: short term, technology changing, virus
  - PXI, VME: middle term, modularity, expensive

- Perfect communication world



- Real world:


Your office
Internet
CERN Network
ELENA
Control room
This is the goal of the work package 10: control command
All this stuff will be transparent for the users
Fieldbus
Local
Ethernet
≠ protocol
Sensor
Detector
Coils
Push-pull
Ventilation

Control Command

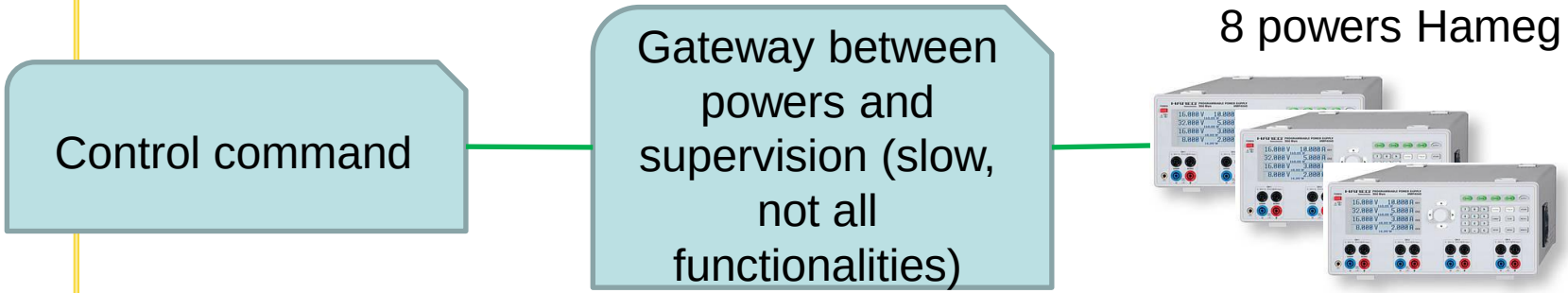
Recommendations

Design Needs

Gbar control command recommendations

- Recommended solution: **CERN hardware compatible**
  - Siemens PLC
  - PCI express
  - VME

- Communication
  - Interface with devices for the slow control: 0-10V, 4-20mA, Profibus or Profinet
  - *Avoid: protocol with material interface like RS232, GPIB, USB, Ethernet, …*
  - If you buy a non compatible instrument:
    - Specific gateway: 2 month + hardware
    - More bugs and more difficult to understand



Control Command

Recommendations

Design Needs

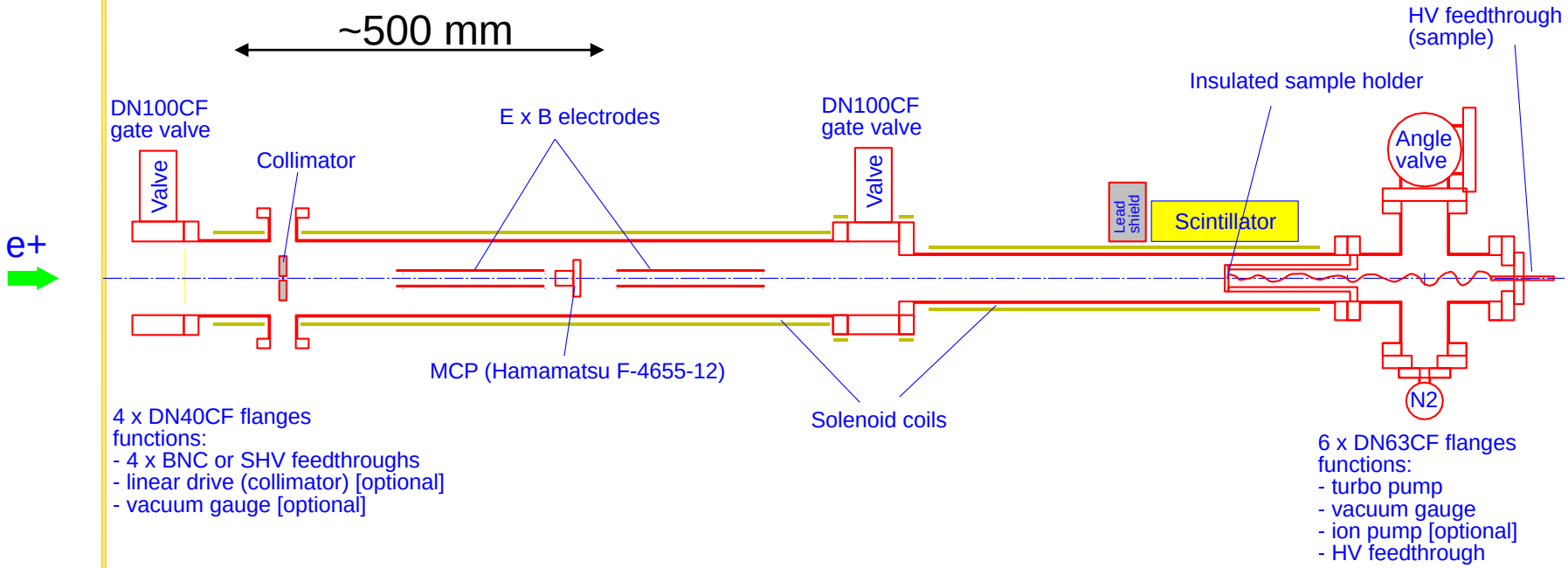
Gbar control command design needs

- Roadmap Gbar control command proposed:
  - Understand the experiment's behavior and performance
  - Define a global system architecture
  - Define control command tests
  - Integrate the control command interface in each subsystem
  - Test the subsystem control command
  - Installation at CERN

Gbar control command design needs

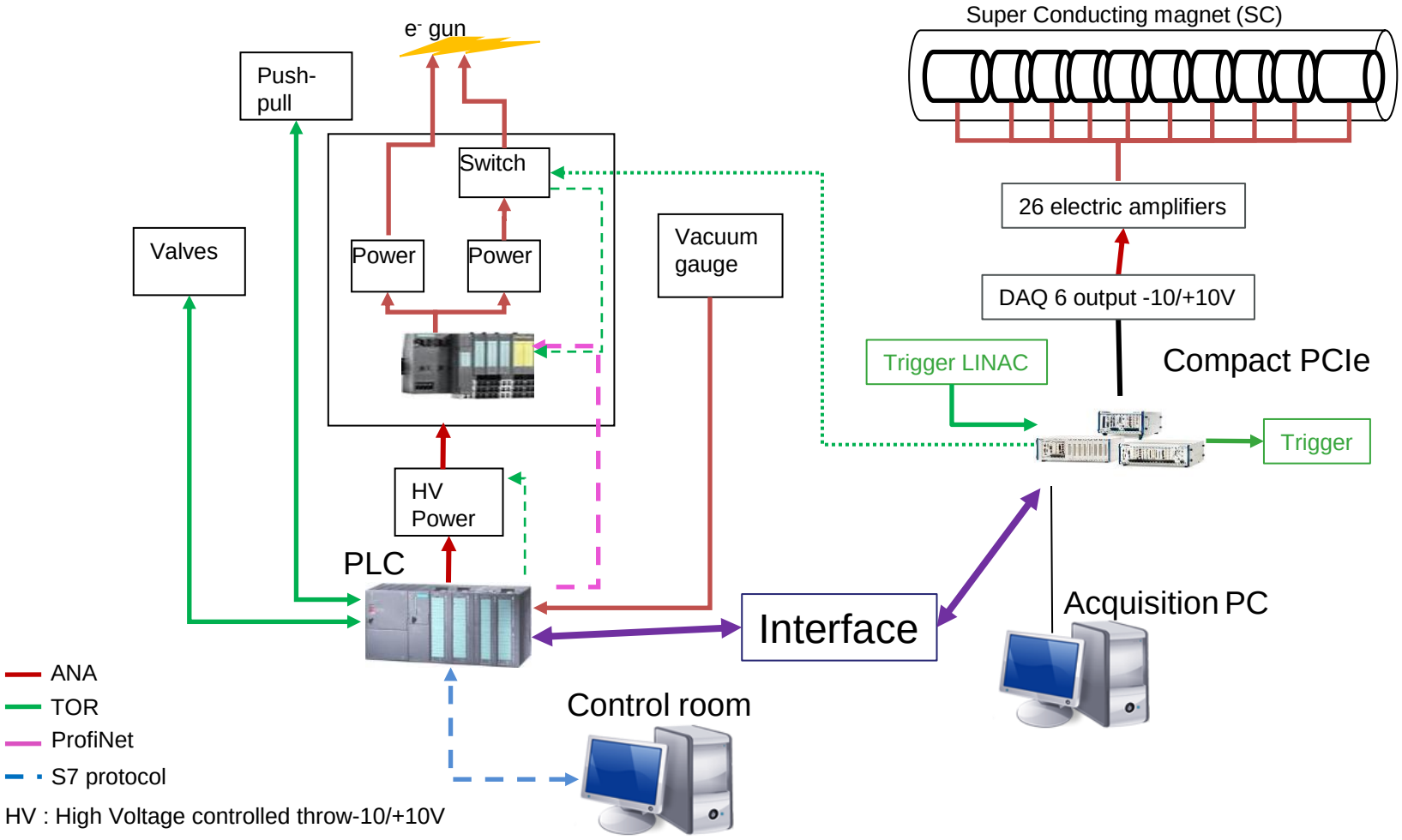
- To design the control command, we need answers to the following questions:
  - What will be automated?
  - What is the automation process?
  - Does the system need information from another one?
  - How do we communicate with the different elements?

- One control command contact person per subsystem in charge of:
  - Object design



Gbar control command design needs

– Instrumentation synoptic: agreement between WP and WP control command



Gbar control command design needs

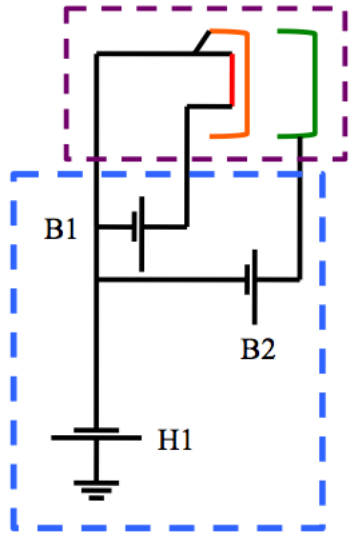
– One list of the I/O for the slow control

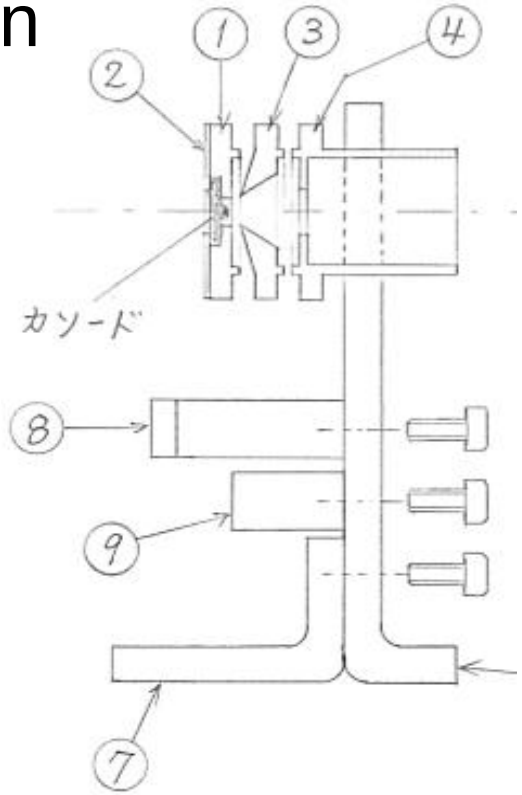
– One list of the I/O for the fast control

Type	Element	fonction	intervalle	nombre	total nombre I/O
I ana	Haute tension, pre-decelerator	lecture tension appliquée	0-10 V	4	16
	Haute tension, decelerator	lecture tension appliquée	0-10 V	1	
	Haute tension, post decelerator	lecture tension appliquée	0-10 V	1	
	Haute tension, quad doublet lens	lecture tension appliquée	0-10 V	4	
	Haute tension, quad triplet lens	lecture tension appliquée	0-10 V	6	
O ana	Haute tension, pre-decelerator	commande tension appliquée	0-10 V	4	16
	Haute tension, decelerator	commande tension appliquée	0-10 V	1	
	Haute tension, post decelerator	commande tension appliquée	0-10 V	1	
	Haute tension, quad doublet lens	commande tension appliquée	0-10 V	4	
	Haute tension, quad triplet lens	commande tension appliquée	0-10 V	6	
I logique	Haute tension, pre-decelerator	lecture interlock		4	17
	Haute tension, decelerator	lecture interlock		1	
	Haute tension, post decelerator	lecture interlock		1	
	Haute tension, quad doublet lens	lecture interlock		4	
	Haute tension, quad triplet lens	lecture interlock		6	
	Switch HT	lecture interlock		1	
O logique	Haute tension, pre-decelerator	commande interlock		4	17
	Haute tension, decelerator	commande interlock		1	
	Haute tension, post decelerator	commande interlock		1	
	Haute tension, quad doublet lens	commande interlock		4	
	Haute tension, quad triplet lens	commande interlock		6	
	Switch HT	commande interlock		1	

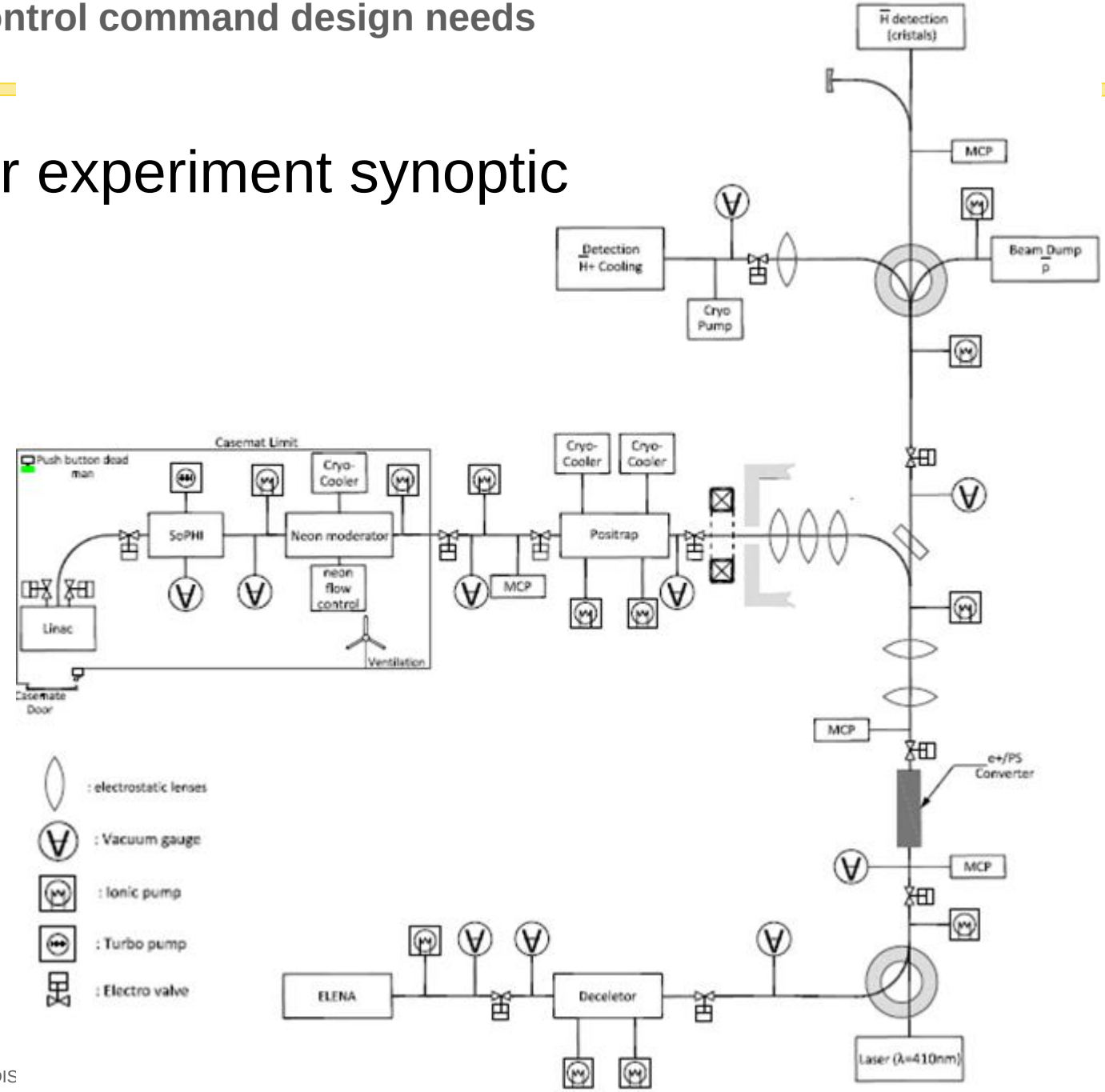
- Describe the behavior of the slow control, or/and fast
- Define the command constraints (range): frequency, amplitude, duration

Penning trap e- gun





Gbar experiment synoptic



Gbar control command design needs

- Questions for CERN and ELENA:
  - NTP, SMTP server
  - Archiving
  - Remote access
  - Maintenance: hardware and software
  - Interface with ELENA control command (hardware and software)
  - Timing system

Gbar control command overview

Thanks for your attention