

Synchronization & Machine Protection System

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With the support of



Outline

- PRAE Synchronization System
 - Role
 - Architecture
 - Hardware

- PRAE Machine Protection System
 - Role
 - Architecture
 - Operation

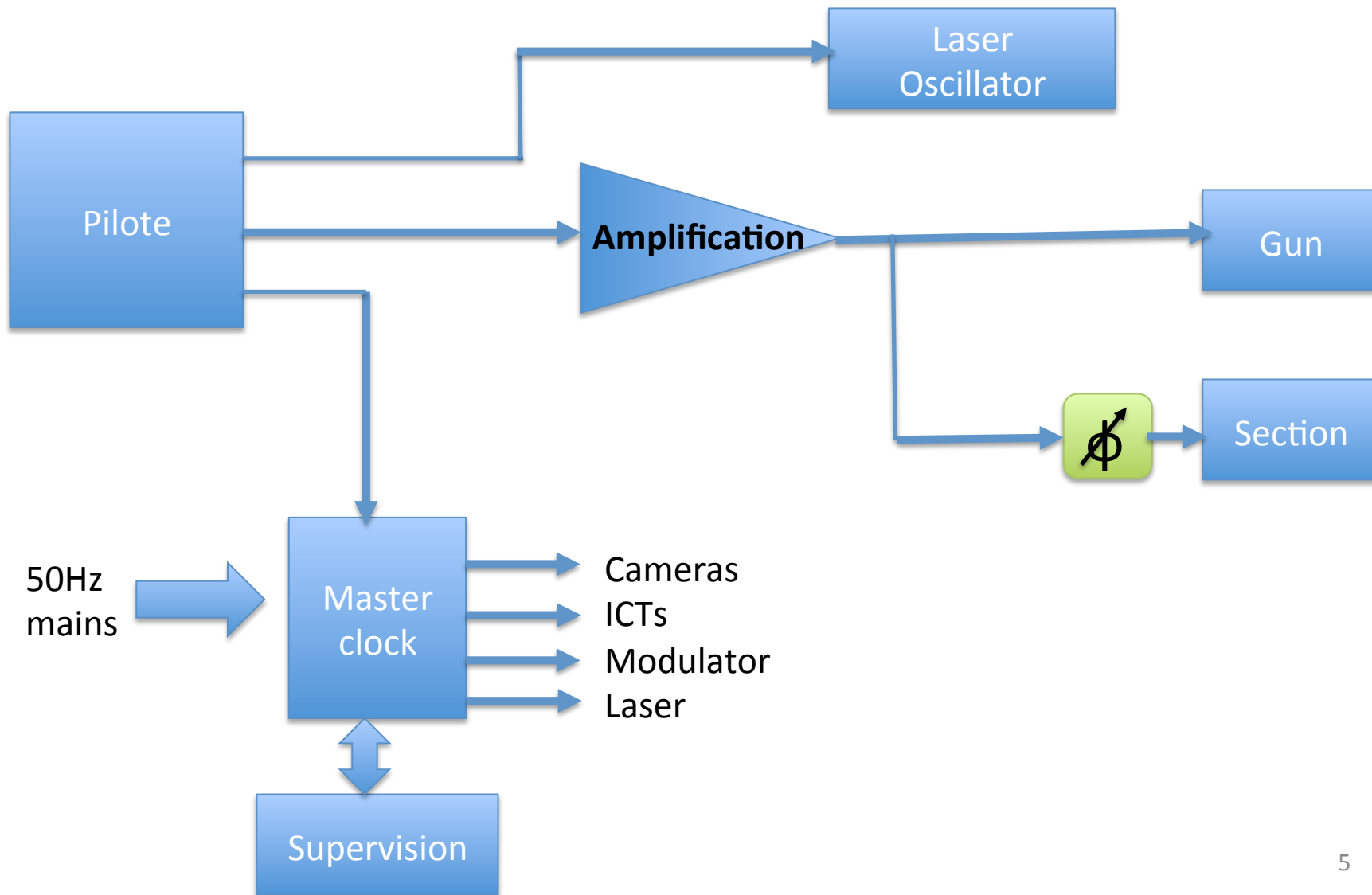
SYNCHRONIZATION SYSTEM

Role of the Synchronization system

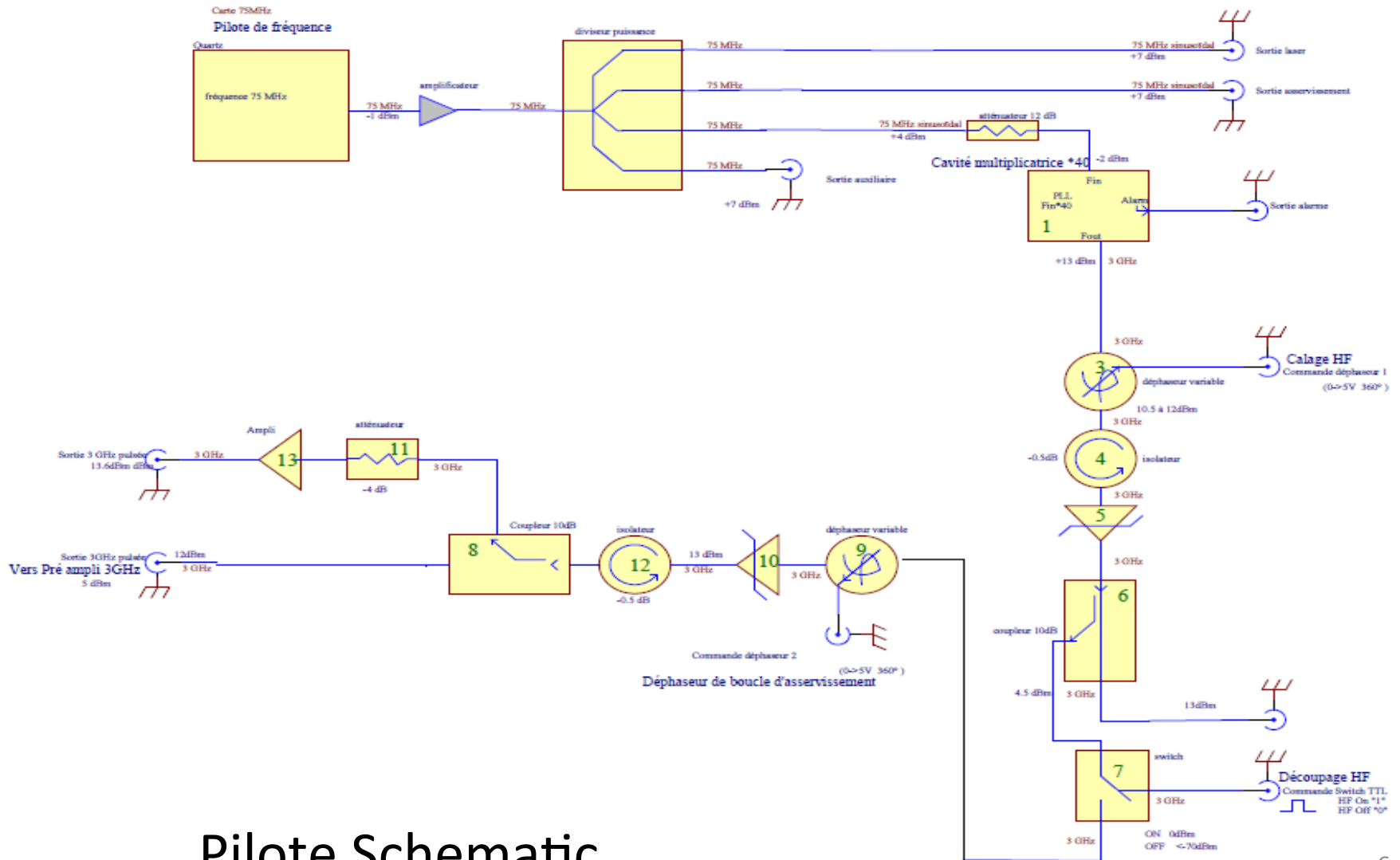
- The task of a timing system is to synchronize all the (relevant) components in an accelerator complex.
- One part of this task usually is to Control the injection by triggering the particle source (gun)
- Triggering beam diagnostic components like beam position monitors, current transformers, profile monitors and so on, to be synchronized to the passage of the beam.
- Fast timing, Slow timing



Architecture



Pilote



Pilote Schematic

Clocs Hardware

Datasheet du GFT1020



GFT1020

20 Channel Digital Delay Generator

Features

- 20 independent delay Channels
 - 100 ps resolution
 - 25 ps rms jitter
 - 10 second range
- Output pulse up to 6 V/50 Ω
- Independent trigger for every channel
- Fours Triggers
 - Three are repetitive from three internal generators
 - One is single-shot from External input, Push button or Software
- External Clocking up to 100 MHz



Time Delay Generator

Informations needed

RF source:

- Laser oscillator frequency
- Gun Bandwidth
- Pre-amplifier input power

Timing:

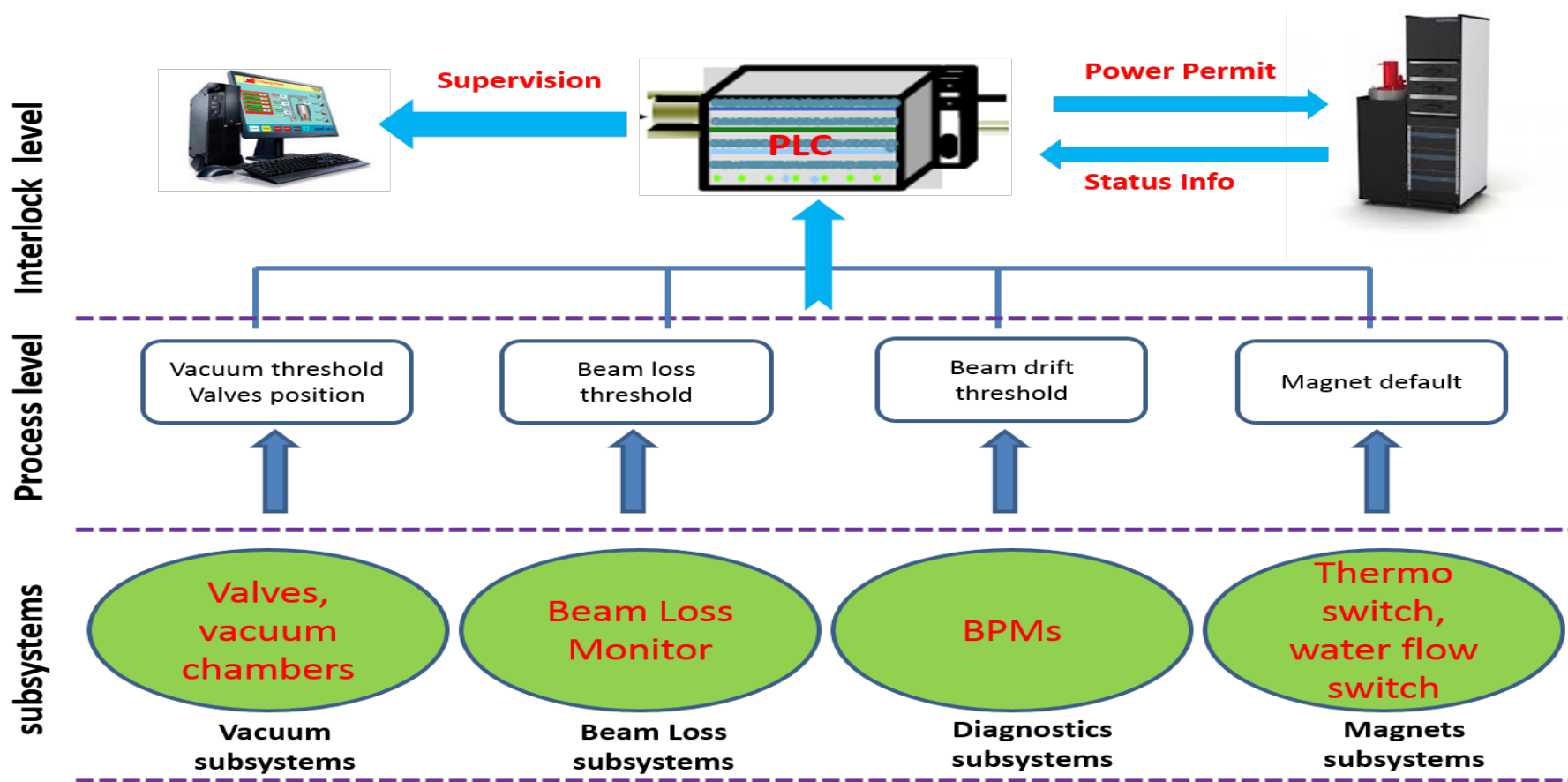
- Number of channels
- Time delay limits
- Timing frequency
- Tolerated jitter

MACHINE PROTECTION SYSTEM

Rôle MPS

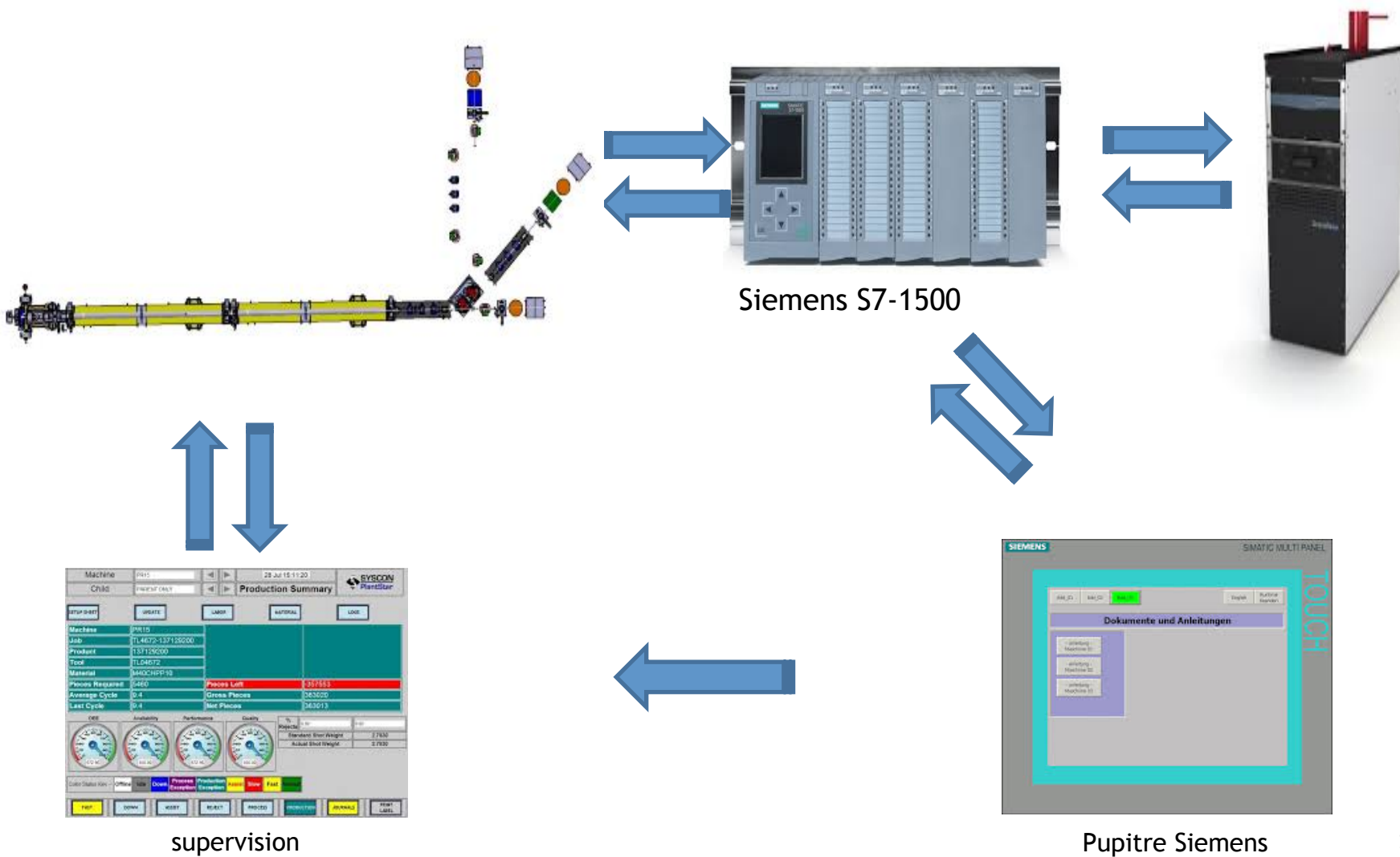
- The Machine protection system is a vital part of the machine which protect the accelerator elements from damage.
- damage of accelerator equipment by beam impact or equipment damage due to its own malfunctioning.
- Machine protection system is operating in a very reliable manner.
- This system collects the critical defaults from the machine subsystems to switch off the RF which kills the beam.

Architecture



- **Process Level:** monitor the variations of different parameters of the machine subsystems, and generates default signal in case of operation problem.
- **Interlock Level:** gathers and process all the default signals from subsystems, and stops the beam

MPS Operation



supervision

Pupitre Siemens

Informations needed

- Concerned elements
- Action to be taken
- Reset default
- Operator mode / Expert mode
- Alarm/interlock



Thank You