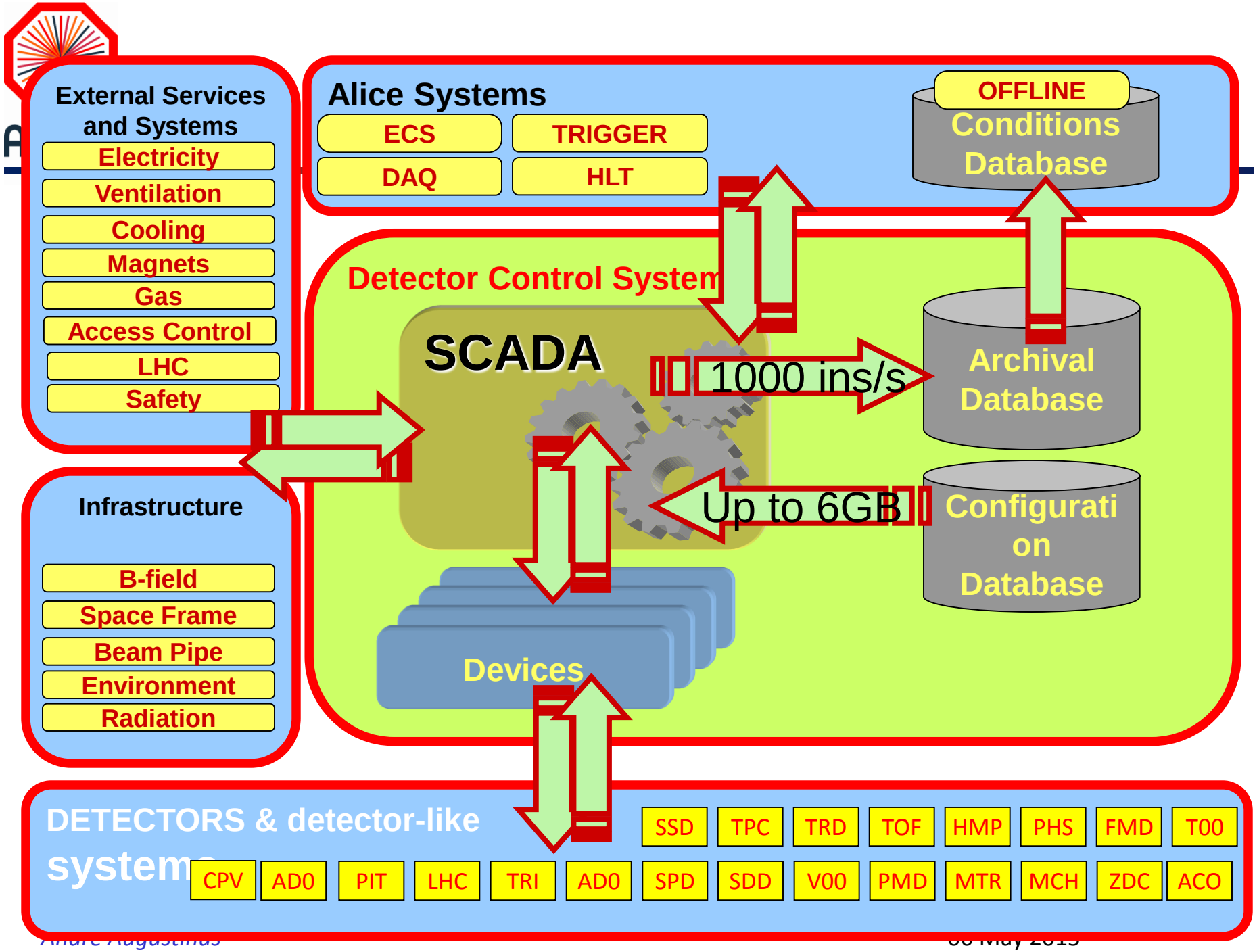
ALICE Detector Control System

- ALICE DCS is responsible for safe, stable and efficient operation of the experiment
- Central monitoring and control of all sub-detectors; interface to online and offline; monitoring of external services and infrastructure
- To be operated by a single operator from the ALICE Control Room
- The core of the ALICE DCS is based on a commercial SCADA system: *WinCC OA*
- A tailored framework is build on top of that to allow sub-detector experts to build their control applications


External Services and Systems
Electricity
Ventilation
Cooling
Magnets
Gas
Access Control
LHC
Safety
Infrastructure
B-field
Space Frame
Beam Pipe
Environment
Radiation
Alice Systems
ECS
TRIGGER
DAQ
HLT
OFFLINE
Conditions Database
Detector Control System
SCADA
1000 ins/s
Archival Database
Up to 6GB
Configuration Database
Devices
DETECTORS & detector-like systems
SSD
TPC
TRD
TOF
HMP
PHS
FMD
T00
CPV
AD0
PIT
LHC
TRI
AD0
SPD
SDD
V00
PMD
MTR
MCH
ZDC
ACO

ALICE Detector Control System

- The DCS cluster consists of ~170 servers installed at P2
- In addition 750 on-detector, embedded computers
- In total over 1200 networked devices
- Nearly 3000 WinCC OA managers forming a distributed system on over 100 computers
- > 1 000 000 channels monitored
- The cluster provides services (file storage, database, central SCADA system, networks and communication exchange, etc.) in 24/365 mode.

ALICE Detector Control System

- Standard devices (power supplies, VME, PLCs, monitoring devices), standard communication protocols (OPC, DIM)
- Abstraction to hide device dependent operation details on the higher levels
- Control behaviour implemented using Finite State Machines
- Data relevant for physics analysis (conditions data), stored in a database, is available for offline system

ALICE Detector Control System

Future (Run2)

- Already entered ‘routine’ operation after LS1
- Several projects to improve operation
  - Alarm handling
  - Operator tools
  - System internals monitoring
  - Log file analysis
  - Quality monitoring of archived data
  - Integration of external systems

ALICE Detector Control System

Future (for ALICE upgrade, LS2 and beyond):

- Core of the DCS will remain
- Dataflow will change
  - Part of DCS data will be embedded in physics data stream
  - Conditions data will need to be available 'online' to allow online data processing
- Integration of new devices and new front-end electronics
- Starting effort in prototyping and validating new dataflow in context of O2 project
- Started integration of new devices and interfacing to new front-end electronics in the context of the ITS upgrade project

ALICE Detector Control System

Hardware related

- Prototyping new technologies for sensors
  - Wireless sensors, sensor networks
- New general purpose I/O devices
- Integration of newest generation PLCs