



EVOLUTION AND FUTURE OF THE ACCESS SAFETY AND CONTROL SYSTEMS

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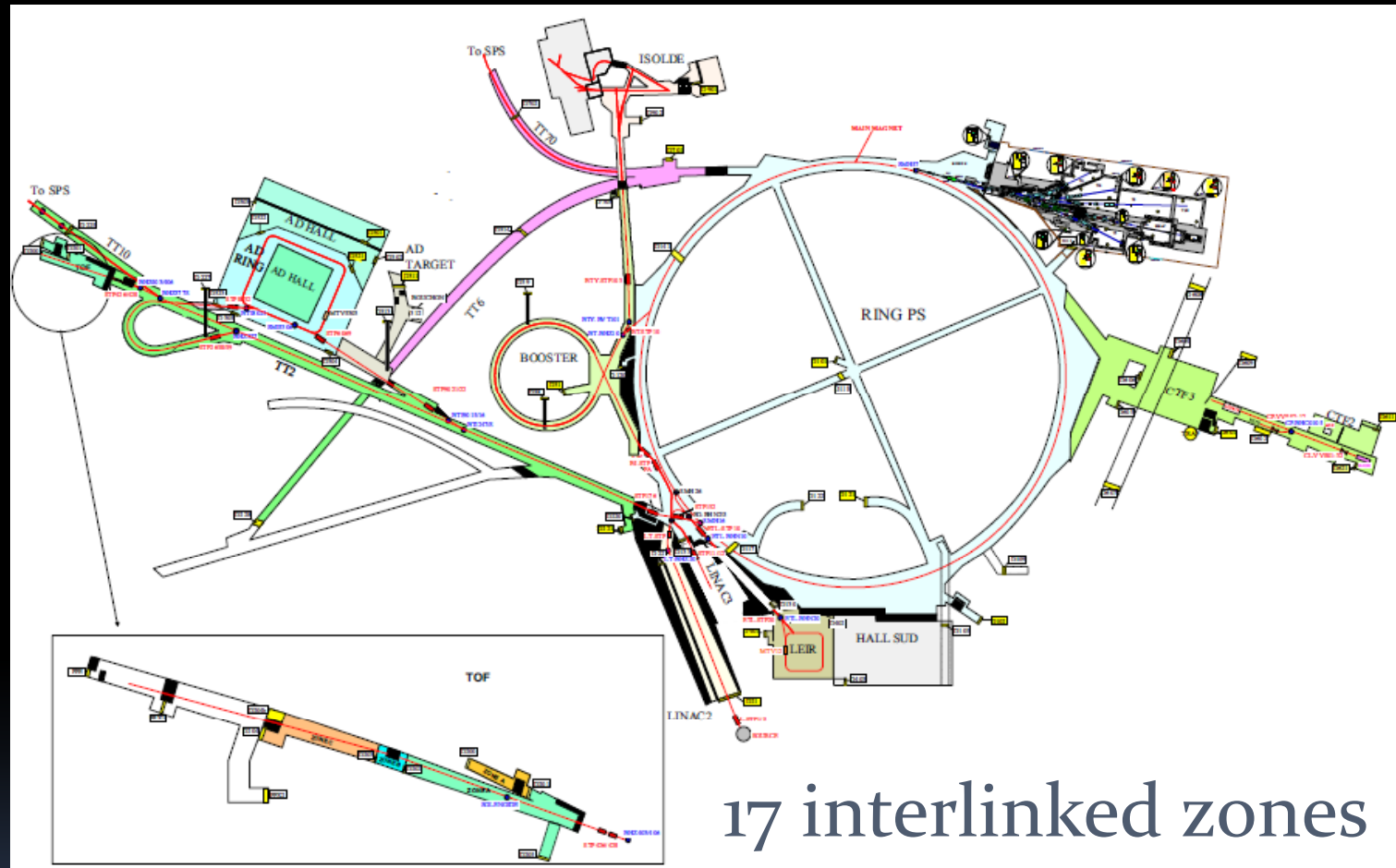
Contents

- Present PS system
- Future PS system and changes w.r.t. LHC
- System Deployment
- What about SPS & Experimental Areas ?
- Concluding remarks



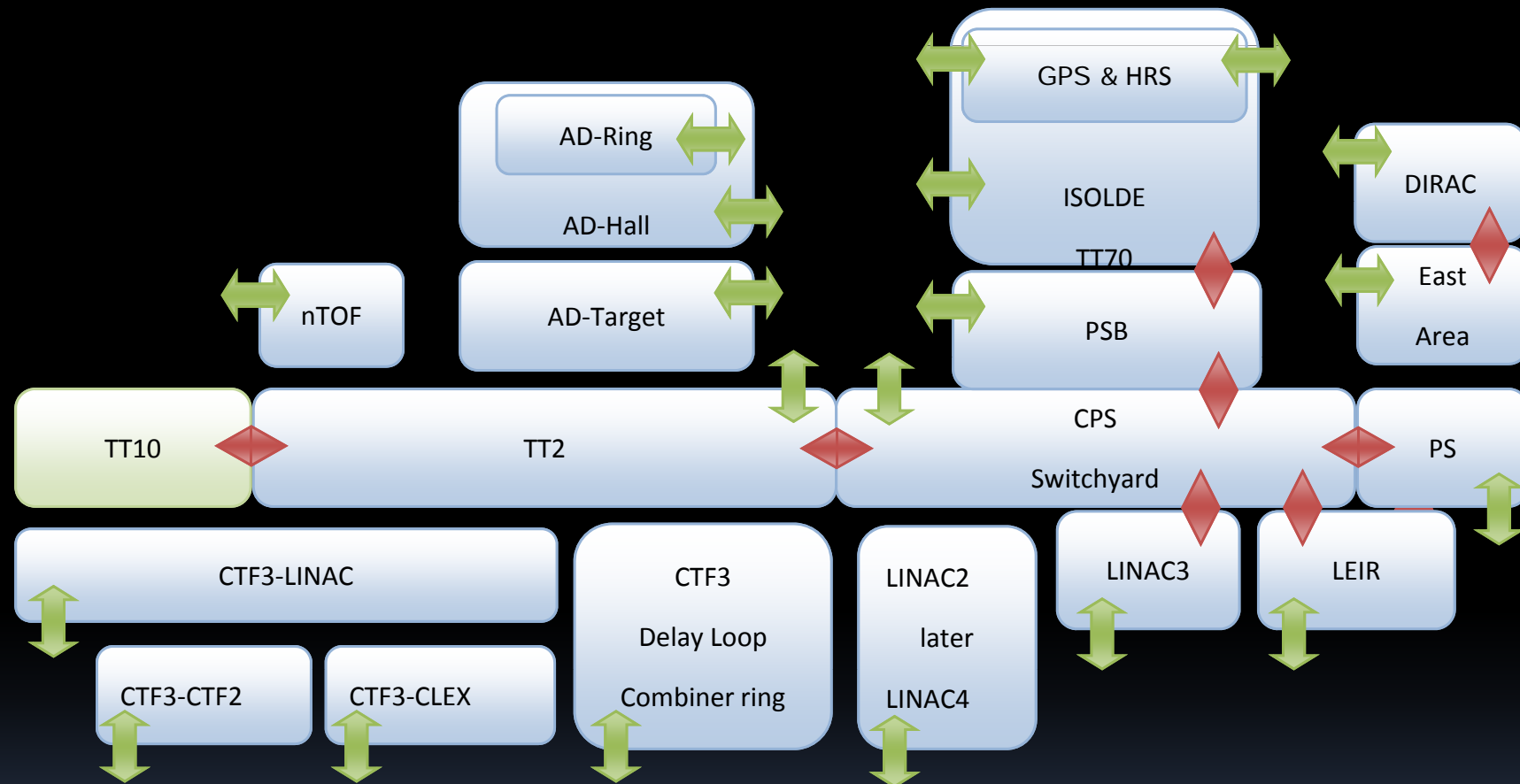
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The PS Complex



- Very compact and complex zoning as the PS Complex was extended and changed over many years
- Integration of equipment in small access areas will not always be easy

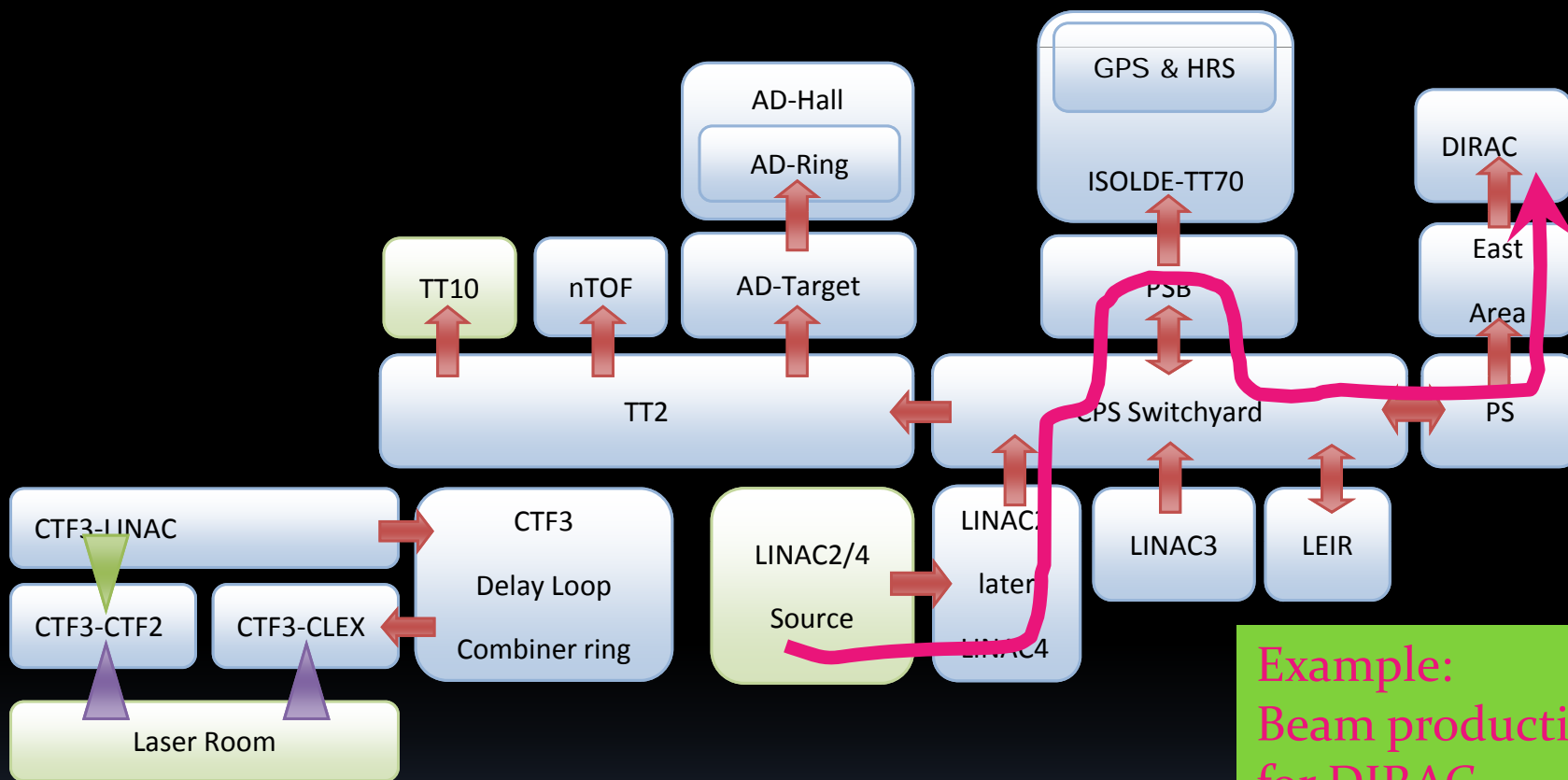
Access to the Different Zones



- The majority of the zones have only 1 access point
- Otherwise only emergency or large material access doors



Source and Destination Zones

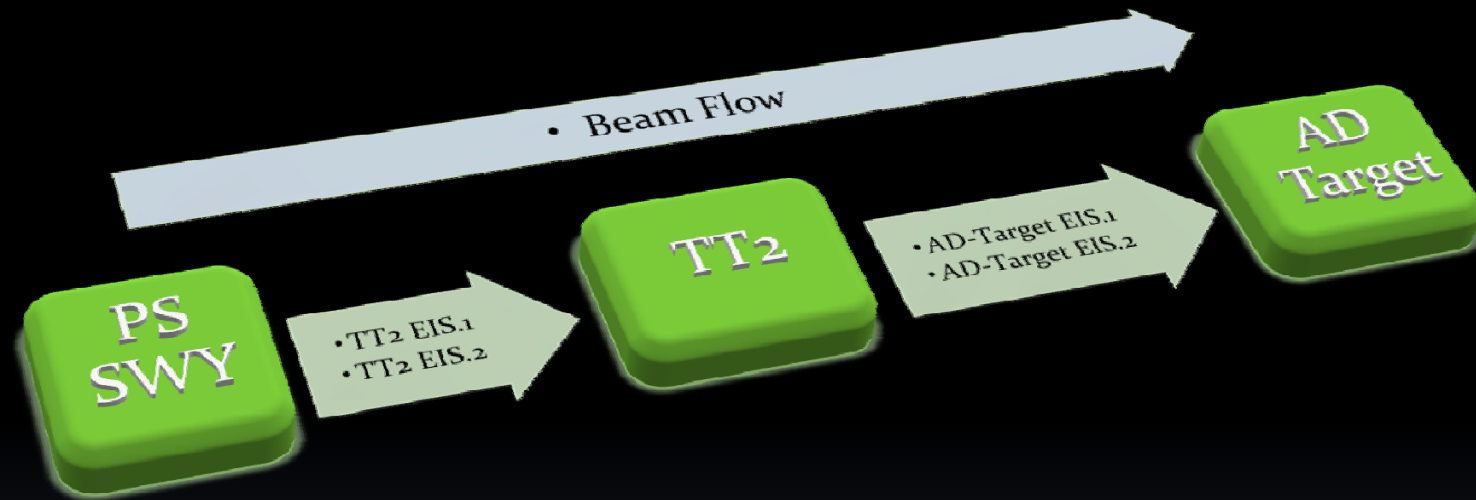


Example:
Beam production
for DIRAC

- Beams flow through many zones
 - source & destination principle

Redundancy

- The new system will re-used the redundancy that we already have in the present system



- The redundancy, in case of failure of one EIS-F, will be propagated one zone upstream of the zone where access takes place
- In total up to three EIS-F can protect a zone

Access Control Responsibility

- The PS Complex operations team:
 - Puts zones in safe for access state (trip of a zone)
 - Distributes keys (authorization done by system)
 - Unlocks remotely the access door
 - Matches the number person entering with number of keys taken
 - Ensures that only persons enter that were authorized
- Large responsibility with OP teams
- No authentication
- Simple access points





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Future PS System

- The future system is based on the main principles of the LHC system:
 - Comply with “Tripartite” agreement (ASN, IRSN, OFSP,..)
 - Use of airlock system to obtain unity passage
 - Biometry (iris) to obtain authentication
 - Less responsibility with OP teams and more automation
 - Well defined system modes
- However,
 - A small material access will be added (back pack, toolbox, oscilloscope, etc.)
 - The access process will be optimized
 - The lessons learn shall be taken into account

Personnel Access Device

- The LHC PAD is fully motorized
- A simplified PAD is being considered, but no compromises on safety



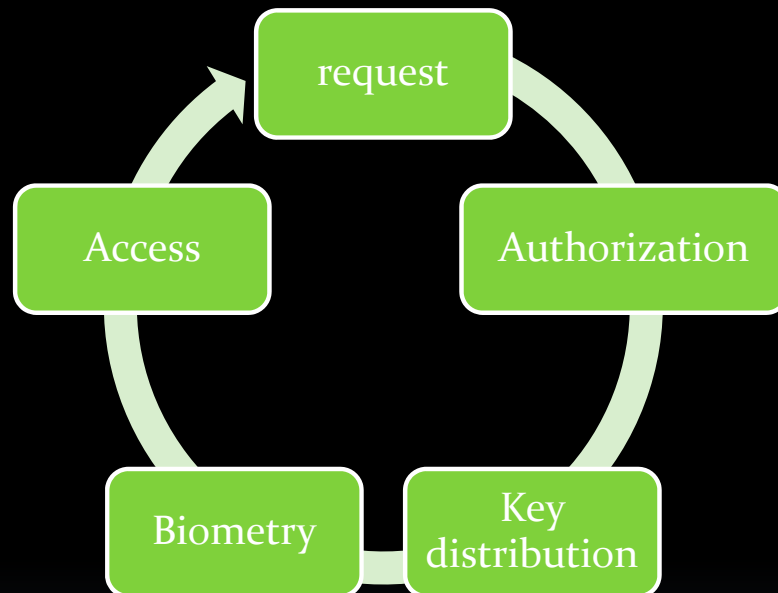
- The more complex it is the higher the risk of break-down



- The MAD will be the same as used in the LHC
- A more manual version will require clear signs

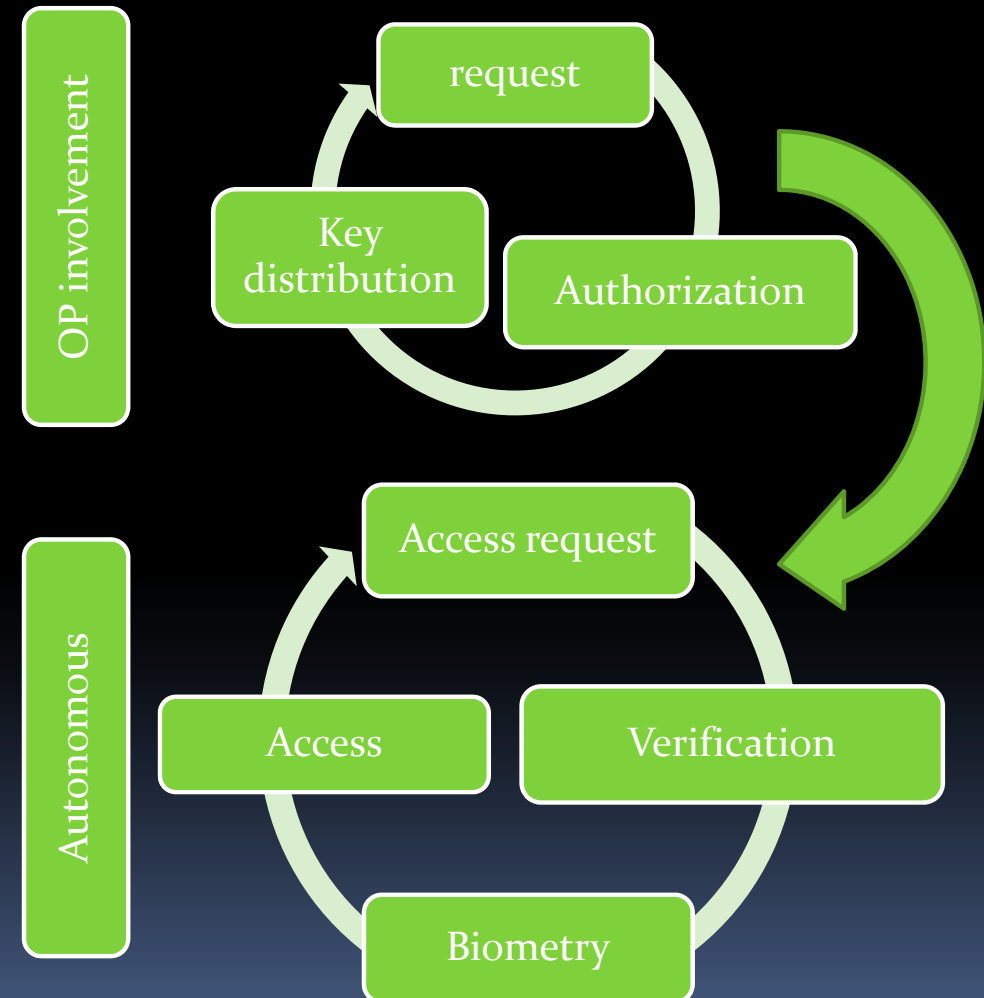
Optimized Access Process (PAD)

LHC in Restricted Access Mode



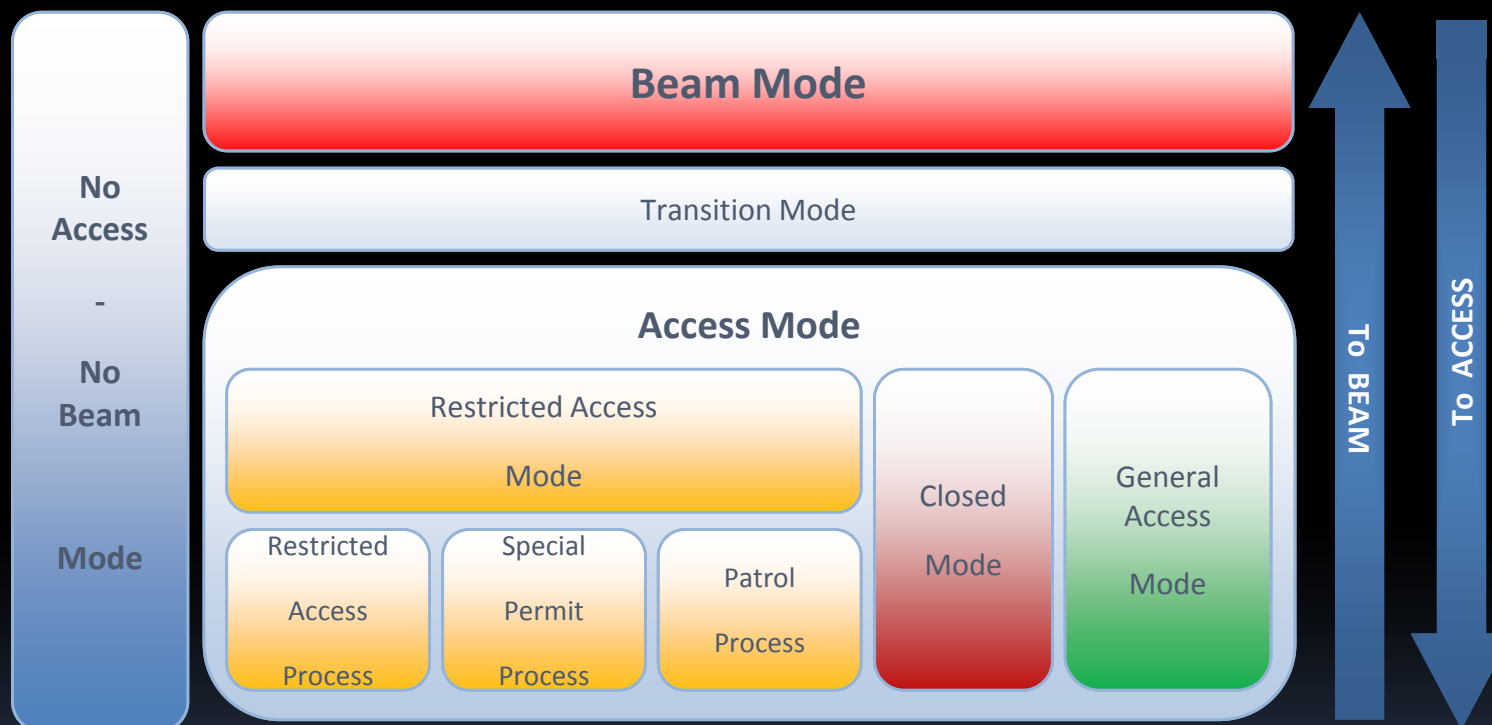
- Key release on hold until access finished
- OP labor intensive

PS in Restricted Access Mode



The system modes

- The system will switch between the following modes for each zone separately:



- The modes are only controlled from the CCC using keys and computers
- In access mode the key can be removed and stored safely
- A test mode is added to safely test EIS-F, using redundancy

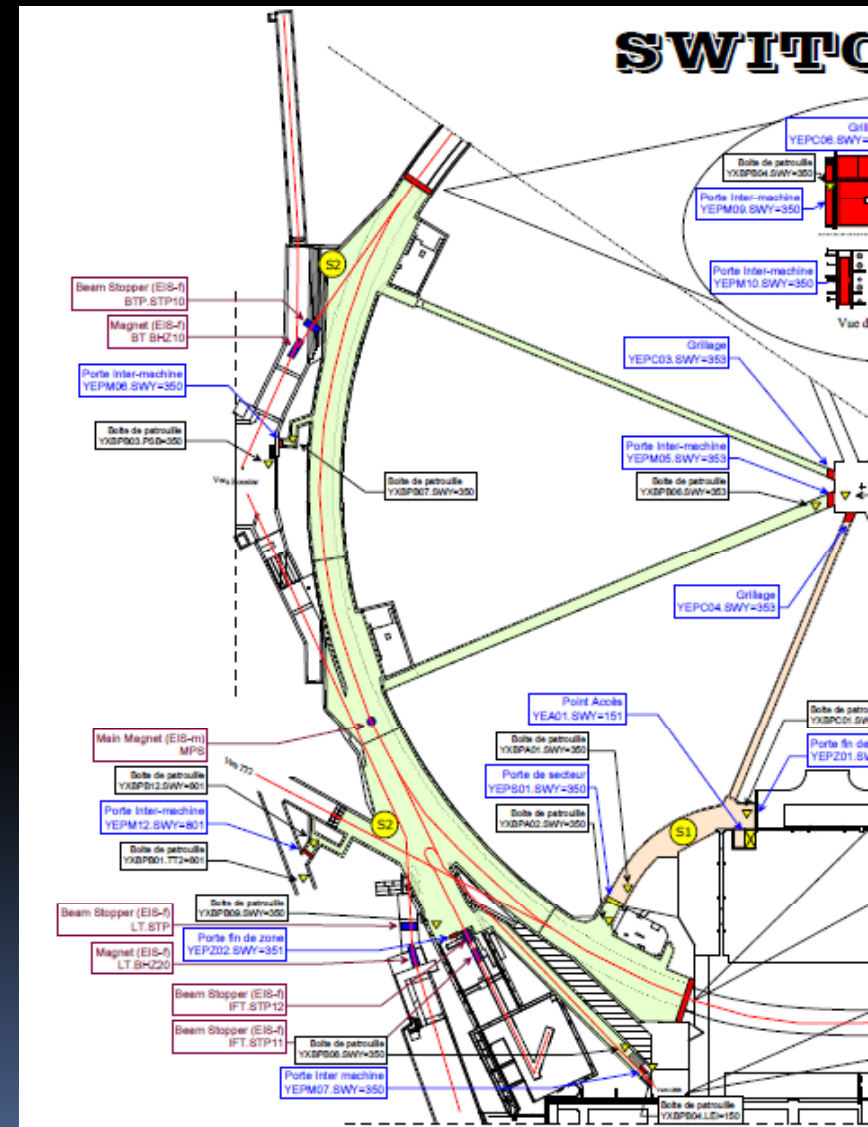


PS Complex Zoning

- The zoning of the PS Complex remains in many cases very similar to today's situation
- However,
 - Some zones will or have been revisited
 - All safety functions will be rationalized (consequences for equipment groups)
 - PS Switchyard will be added (inflector zone)
- Each zone can be exploited independently, even when another zone is being re-configured

PS Switchyard

- Will become a proper zone with its own access point
- No use of magnetic switches close to the machine !
- Advantage/disadvantage
 - PSB can have beam during access in a major part of the PS
 - No continuity in PS path all the time





“Lost and Found”

Lost

- Visitor Cards
- Blind access procedure
- Automatic EIS-F control when zone is tripped
- Vocal warning in the zone

Found

- Authentication
- Unity passage
- Autonomous access
- General access mode
- Special Permit
- RP VETO
- Switchyard zone
- Proper beam imminent warning and evacuation alarm
- ...



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- **System Deployment**
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Complete or Partial Deployment

- The aim is to deploy the new PS access and safety system during the 2013/2014 long shutdown (LS1)
- Most likely a partial deployment of a large number of complete zones will take place
- However, non-renovated and renovated zones shall be fully exploitable
 - Safety links
 - CCC console
- LHC injector chain has priority
 - Short shutdown periods for non-LHC related zones are generally longer
- In any case good training for the Users and the OP teams will have to be provided



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What about the SPS ?

- A working group started end of last year
 - GS/ASE
 - BE-OP-SPS (J. Ridewood, J. Axensalva)
- Presently an inventory of safety chains and hazards/risks is being made
- No clear vision yet (too early)
- In order to comply with Tripartite regulation same principles as used in LHC and PS Complex will have to be adopted



The Experimental Areas

- In the PS experimental areas are autonomous since years
 - Experimentalists are responsible for access to their zone(s)
 - PS OP teams has a supervision system using TIM-viewer for support
- SPS North Area is being renovated
 - Until now SPS OP team managed modes and keys
 - The new system works with same principles as PS experimental areas
 - SPS OP teams will have a supervision system using TIM-viewer for support (OP development)
 - The new system has to be operational for start up in May



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Concluding Remarks (1)

- The new PS access control and safety system will use same main principles as LHC
 - Lessons learned will be taken into account
- SPS will follow
- Many processes and procedures will therefore be homogenized across all accelerators
 - Unity passage
 - Authentication using biometric checks
 - Access using RF-Id on personal dosimeter
 - Visitor categorization and access
 - Material access
- However, new(er)/other technology will be used



Concluding Remarks (2)

- Partial deployment requires careful interfacing with present system
 - Safety functions and Operability from CCC
- Training on the new access and safety system for users and the OP teams is very important for successful exploitation
- The access systems for experimental areas are all based on the same functional principle and require less intervention by CCC
 - More autonomy with experimentalists, but supervision remains available in CCC for support