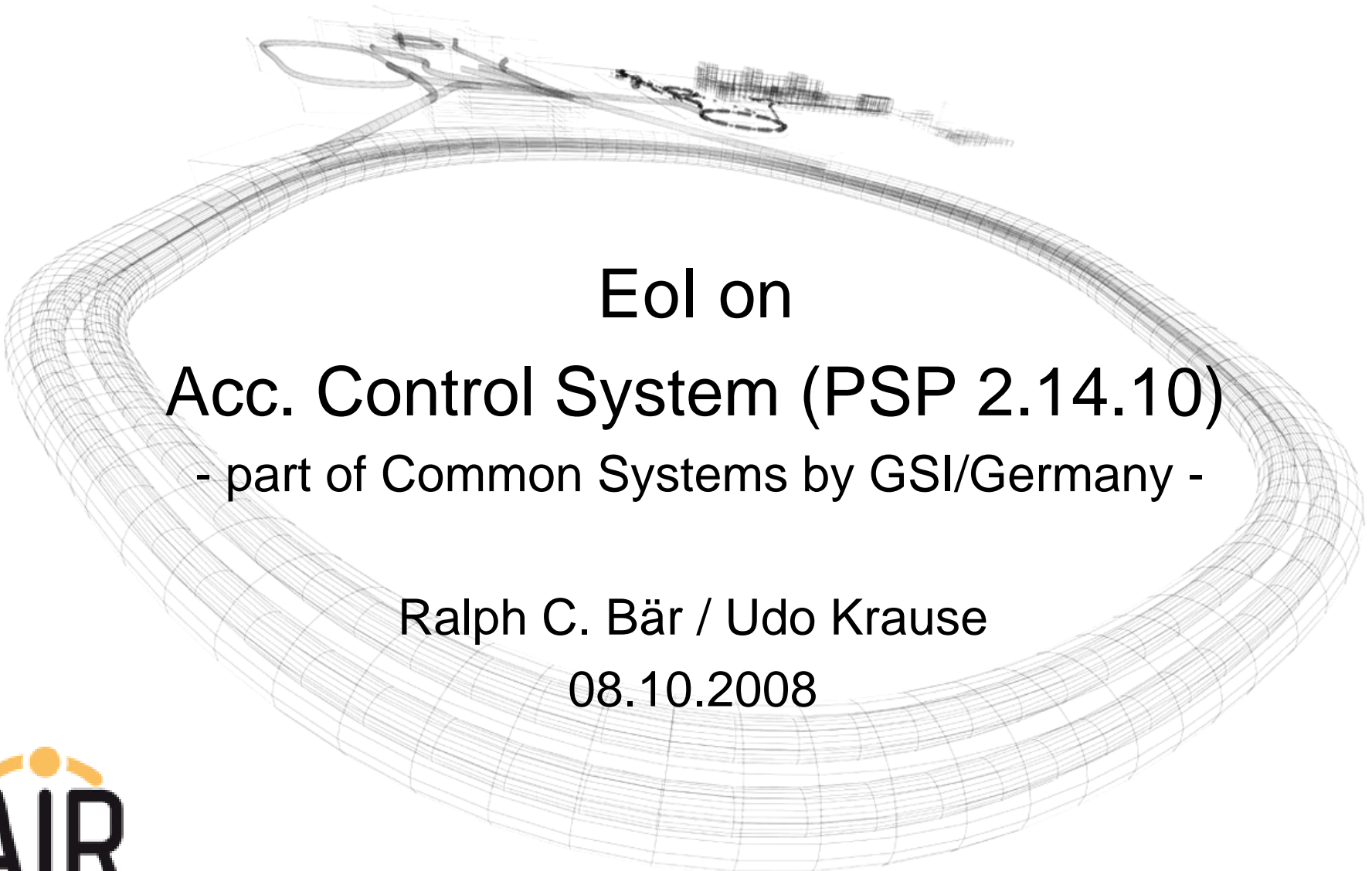# EoI on
Acc. Control System (PSP 2.14.10)
- part of Common Systems by GSI/Germany -

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Description on EoI (acc. control system)

The Controls WP cannot assigned to a single machine.

Due to its central role and integrating character (present installation), the WP shall be taken over by GSI/Controls group.

General description

The working package "Accelerator Controls" comprises the full electronics, hard- and software infrastructure base for all accelerators and beam-lines of FAIR and GSI that is needed to control, commission, run and operate the GSI/FAIR accelerator complex.

GSI Controls group will develop, install, commission and optimize the accelerator control system and is presently preparing to do so.

Description on EoI (acc. control system)

In the CB the WP is formally structured in the following items:

2.14.10.1	Central IT installations, FAIR control centre
2.14.10.2	Front-End systems (equipment control)
2.14.10.3	General Machine Timing (GMT)
2.14.10.4	BuTiS (bunch timing system) (-> resp. RF group)
2.14.10.5	Networking
2.14.10.6	Controls infrastructure (racks, etc.)
2.14.10.7	Installation
2.14.10.8	Software development (-> manpower)
2.14.10.9	Machine protection

Description on EoI (acc. control system)

Controls in some more details:

Equipment control and Timing

- FE controllers to all equipment (except beam diagnostics DAQ systems)
- equipment interface electronics (standard solutions), e.g. function generators
- GMT - general machine timing system (generators, receivers, distribution, ...)
- bunch timing system (-> covered by RF group at GSI)
- Cabling

Software

- Frond-end software framework
- implementation of general equipment control classes
- Communication middleware software and services
- Control services (DB, alarming, logging, trending, many more)
- Application software framework
- All applications programs for operation
- Software framework for machine setting/tuning/trimming and data management
- Software framework and implementation for Industrial Controls

GSI

Description on EoI (acc. control system)

Network

- all active and passive network components needed for FAIR controls
- provide network access for experiments in accelerator environment
- cables, racks, infrastructure

Control center

- Central control room installations
- consoles, fixed displays, special electronics

Machine protection

- machine interlock system
- machine protection system (beam), still to be specified

Schedule (details)

Schedule breaks down in several sub-projects of different character...

Schedule (control system WP)

Control system common for all FAIR machines.

S-FRS/HEBT is the first facility part to be installed and commissioned (start installation 10/2012, commissioning 09/2013).
The following dates mark the major milestones:

1. "Draft engineering design"   09/2009

2. "Final engineering design"   08/2010
   -> prototyping developments, tests, validation

3. "pre-series model tested"   05/2011
   -> core system completed, implementation in existing GSI acc. facility, field tests

4. "begin series production"   09/2010 (software), 01/2012 (hardware)
   -> applications, specific device classes, integration works, ...

5. "end of installation"   09/2012 (hardware), 05/2013 (software)
   -> ready for integration tests and full system commissioning

Resources

Financial Resources

- Costbook specifies the budget (-> ok)

Manpower Resources

Manpower needed for developments (HW, SW, frameworks), coordination, coaching, support of external developers (FAIR partners, companies, etc.)

- Costbook specifies 245 PY (35 FTE x 7 years) for Controls developments
- Presently, Controls group also busy with non-FAIR projects, binding personal resources.
  After completion of present projects: 13,5 FTE for FAIR
- Additionally needed manpower ~150 PY
- Presently Controls group personal resources are not adequate, significant and early buildup necessary for the schedule presented

Requirements

Resources

- Buildup of Controls group team required (mainly engineers), personal resources are needed early in the project (early 2009)
- complete present projects and migration/upgrade programs
- concentrate on FAIR developments (but: ongoing MD, operation support)
- redirection of GSI staff/positions necessary (has already started in 2008)
- full budget from Costbook 2.14.10 must be available to Controls group

General

- minimize development effort by using existing cs products, solutions and developments from other labs (CERN). Already ongoing: some evaluation done, first decisions taken.
- policy of strict technical standardization essential (good support from FAIR project management)
- for successful system commissioning: use FAIR system already on existing facility (field tests)