An aerial rendering of the FAIR facility, showing a complex of buildings, roads, and green spaces. The facility is surrounded by a dense forest. The text "An International Facility for Antiproton and Ion Research in Europe" is overlaid in red, bold, serif font.

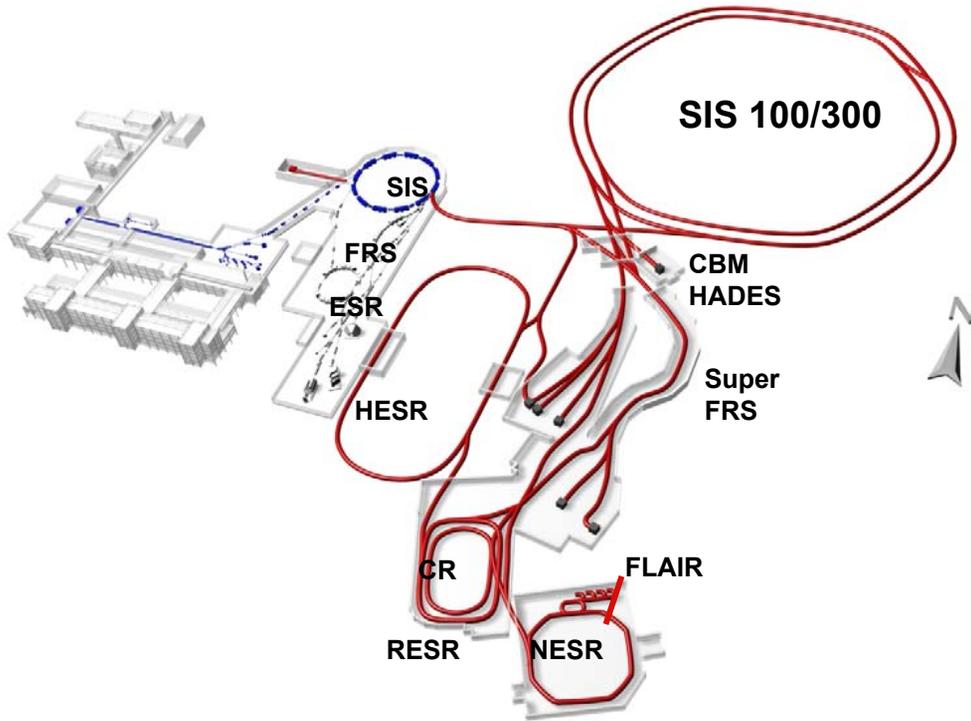
**An International
Facility for Antiproton and Ion Research
in Europe**

J. Eschke,

GSI Darmstadt

- Status of FAIR project
- Preparation of FAIR EU FP7 Proposals

International FAIR Project: → Intensity Frontiers



Primary Beams

- $10^{12}/s$; 1.5-2 GeV/u; $^{238}\text{U}^{28+}$
- Factor 100-**1000** over present intensity
- $2(4)\times 10^{13}/s$ 30 GeV protons
- $10^{10}/s$ $^{238}\text{U}^{92+}$ up to 35 GeV/u
- up to 90 GeV protons

Secondary Beams

- Broad range of radioactive beams up to 1.5 - 2 GeV/u; up to factor **10 000** in intensity over present
- Antiprotons 0 - 15 GeV

Storage and Cooler Rings

- Radioactive beams
- $e^- - A$ (or Antiproton-A) collider
- 10^{11} stored and cooled 0.8 - 14.5 GeV antiprotons
- Polarized antiprotons(?)

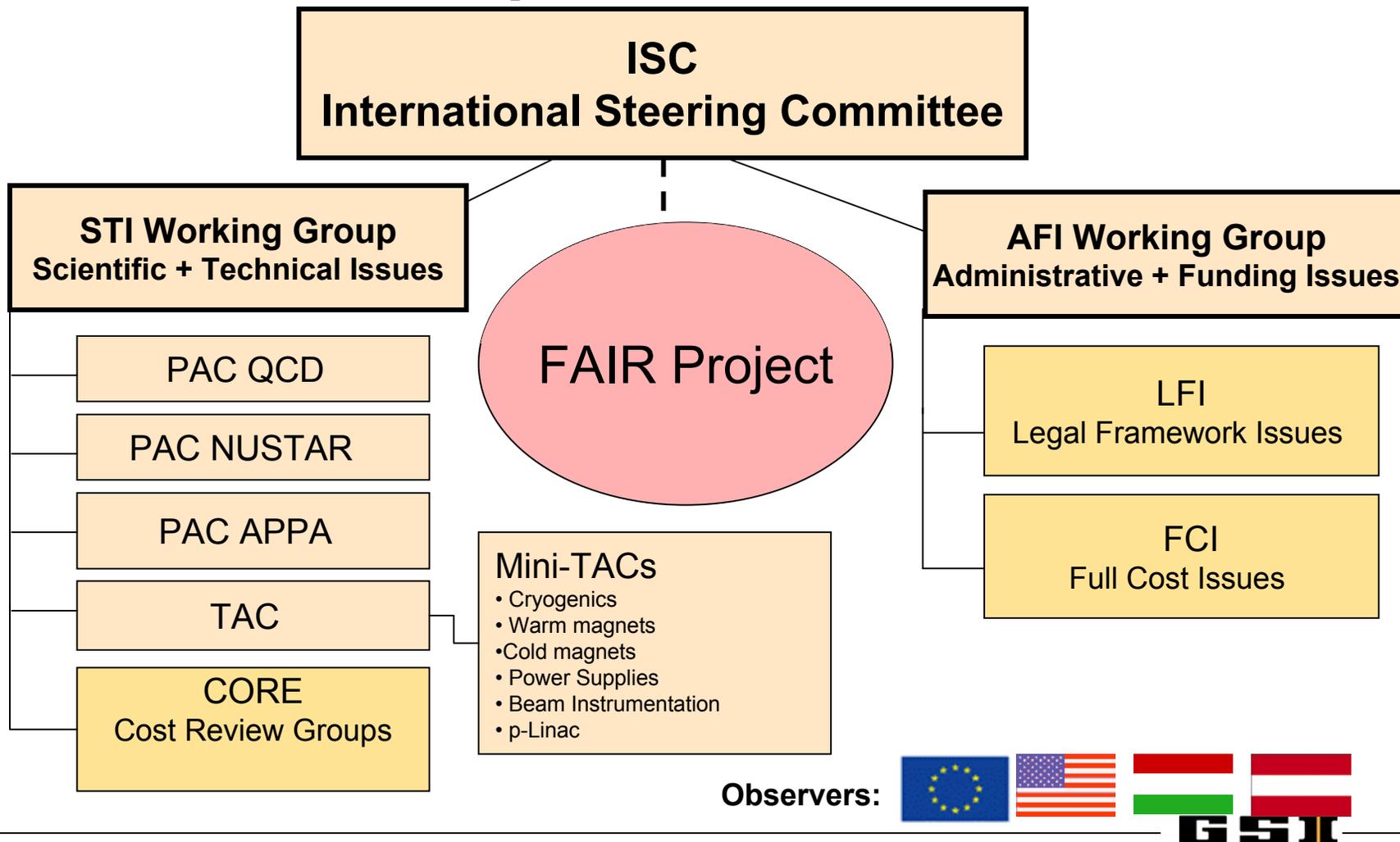
Key Technical Features

- Cooled beams
- Rapidly cycling superconducting magnets

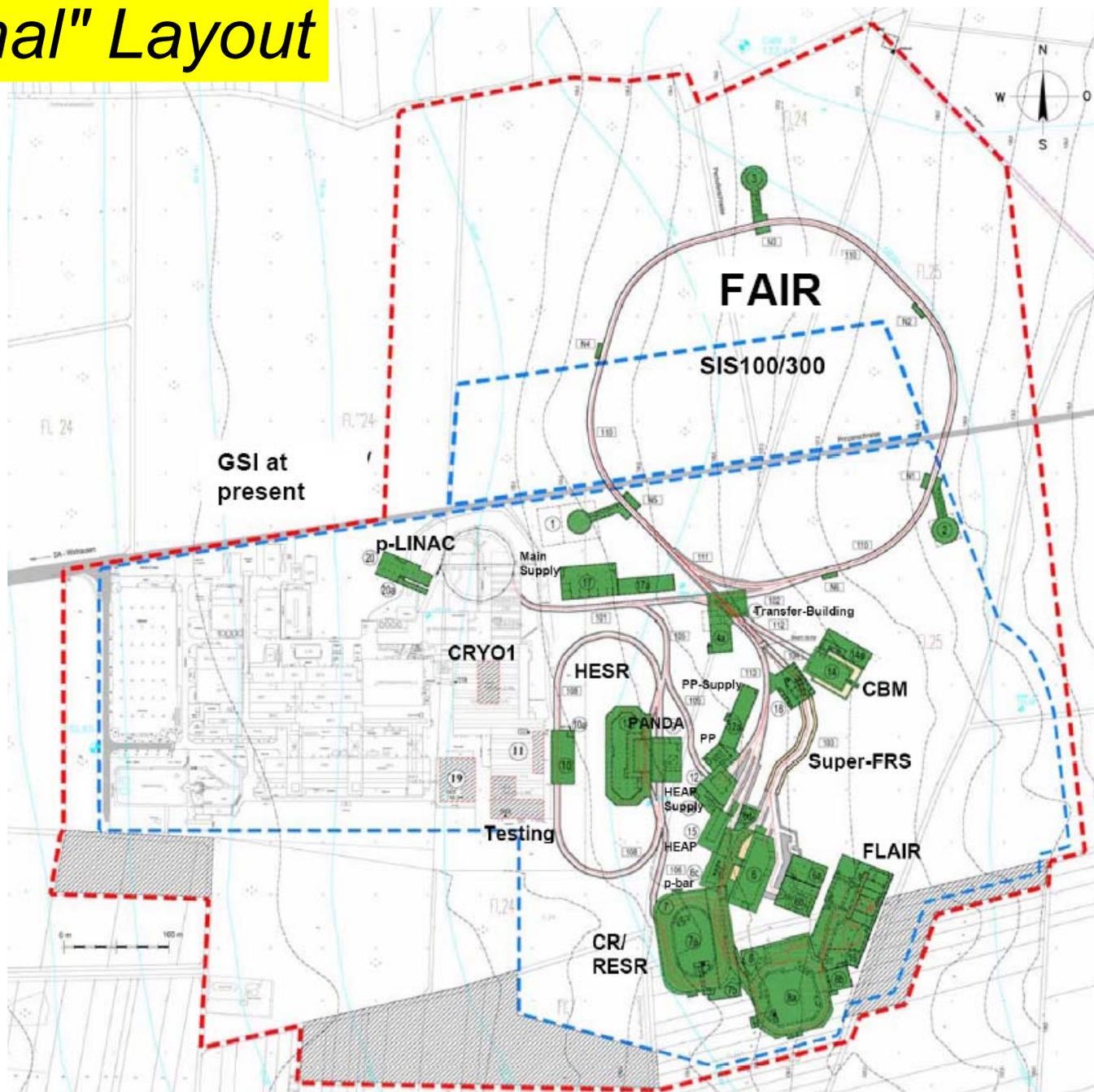
Present Committee Structure of the International Project FAIR



13 potential 'Memberstates'



"Final" Layout



CN DE ES FI FR GB GR IN IT PL RO RU SE



FAIR Baseline Technical Report

Official FAIR project description

6 Volumes with more than 3500 pages and more than 2600 authors

- | | |
|------------------|---|
| Volume 1 | Executive Summary |
| Volume 2 | Accelerator and Scientific Infrastructure |
| Volume 3A | Experiment Proposals on QCD Physics |
| | 3.1 CBM |
| Volume 3B | Experiment Proposals on QCD Physics |
| | 3.2 PANDA |
| | 3.3 PAX |
| | 3.4 ASSIA |
| Volume 4 | Experiment Proposals on Nuclear Structure & Astro Physics (NUSTAR) |
| | 4.1 LEB-SuperFRS |
| | 4.2 HISPEC/DESPEC |
| | 4.3 MATS |
| | 4.4 LASPEC |
| | 4.5 R3B |
| | 4.6 ILIMA |
| | 4.7 AIC |
| | 4.8 ELISe |
| | 4.9 EXL |
| Volume 5 | Experiment Proposals on Atomic, Plasma & Applied Physics (APPA) |
| | 5.1 SPARC |
| | 5.2 HEDgeHOB |
| | 5.3 WDM |
| | 5.4 FLAIR |
| | 5.5 BIOMAT |
| Volume 6 | Civil Construction and Safety |



*For download of the report:
<http://www.gsi.de/fair/reports/btr.html>*

FAIR Baseline Cost

CORE Evaluation
and TAC recommendation

	(M€)
Accelerators	533
Baseline Experiments **	180
Buildings & Supply Systems	289
<hr/>	
Total Investments	1002
Manpower (2400 MY)	185
<hr/>	
Total Project Construction Cost	1187

75% of construction cost from Germany, 25% from member states
Operation costs shared among member states

** additional funding expected from 30 non-member states already involved in FAIR experiments

STI Recommendations on Experiments

Experiment	PAC	Core Facility	Comments
R3B	NUSTAR	yes	
HISPEC/DESPEC	NUSTAR	yes	
ILIMA	NUSTAR	yes	
LASPEC	NUSTAR	yes	
MATS	NUSTAR	yes	
AIC	NUSTAR	no	open scientific & techn. issues
ELISe	NUSTAR	yes	
EXL	NUSTAR	yes	
NCAP	NUSTAR	no	request beam-time
EXO-pbar	NUSTAR	no	
PANDA	QCD	yes	
CBM	QCD	yes	
PAX	QCD	no	Strong scientific merit → prove feasibility
ASSIA	QCD	no	Consider joining PAX
LAPLACE/HIHEX/WDM	APPA	yes	should merge under one umbrella
FLAIR	APPA	yes	not part of the initial CDR
SPARC	APPA	yes	
BIOMAT	APPA	yes	



Project Status and next steps:

Status:

- ✓ Building Development plan legally settled
- ✓ All environmental impact studies are accepted; Re-forestation and natural compensation measures are concluded and contractually settled
- ✓ Controlling report for the preparatory phase accepted by GSI Supervisory Board
- ✓ Core facility and Specifications defined
- ✓ Layout defined
- ✓ Project cost estimates (cost book, WBS) scrutinized and validated by expert groups
- ✓ Prototyping has started
- ✓ Scientific base programme is defined
- ✓ **Baseline Technical Report** ready and issued 21 March (~ 3500 pages, ~2500 authors)

Project Status and next steps:

Status:

- ✓ Legal documents and Governance structure (two-company model) finalized and agreed upon by the ISC (by laws to be completed; tax status to be confirmed)
- ✓ Roadmap presented to the ISC.
Goal: foundation of FAIR GmbH in May/June 2007 (→ **Joint Core Team**)

The International Steering Committee confirmed all this joint preparatory work and its results as fully conforming to the requirements of the FAIR MoU and as

" the Project."

Consequence: all conditions to finalize negotiations on governmental level are met.

Convention

(Governmental Contract –
provisions for general framework, procedures, arrangements; annexes?)

Articles of Association

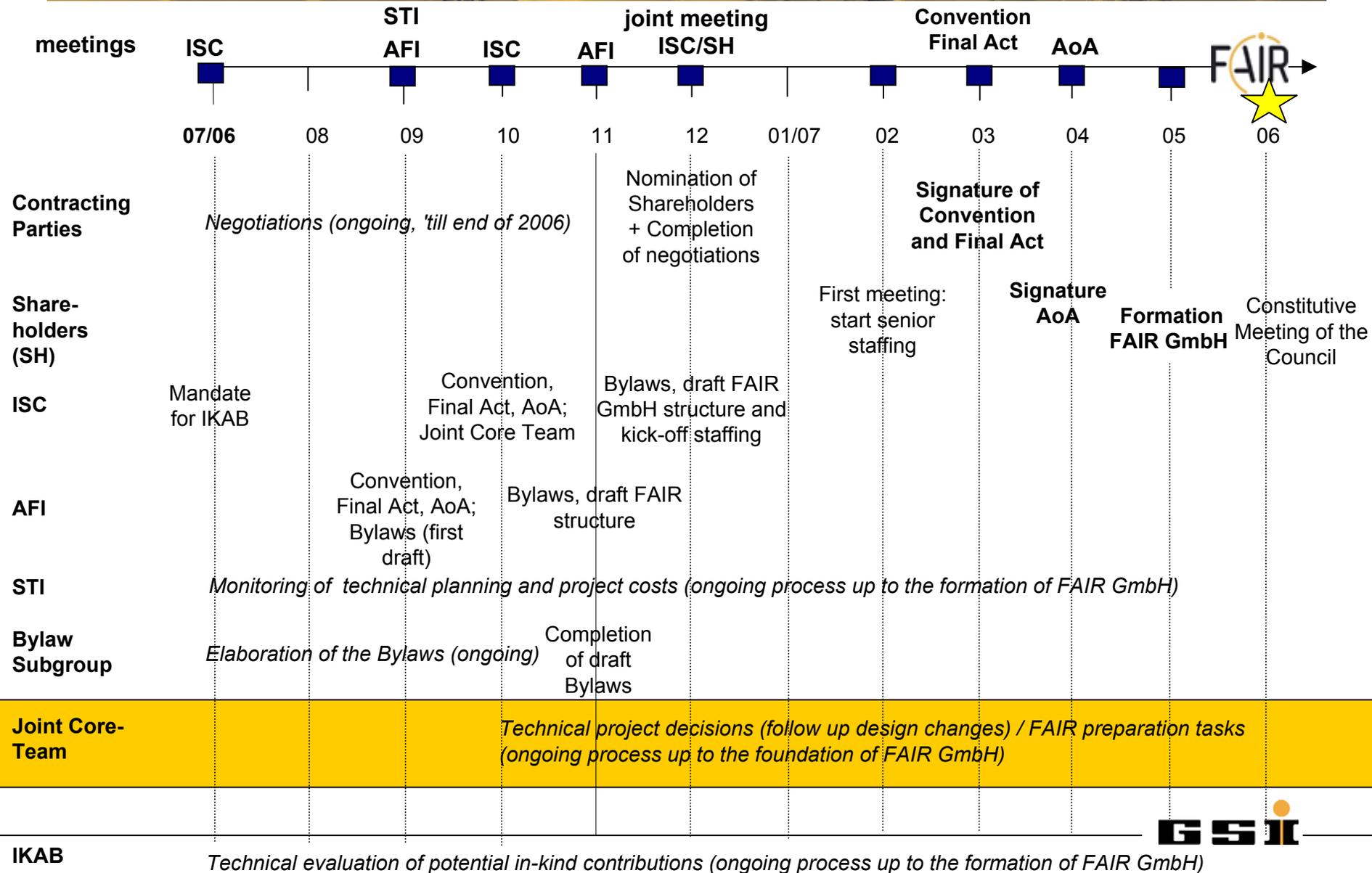
(based on rules of German limited liability company (GmbH) law;
recorded and registered with notary public;
any changes require full notary public process)

By-Laws

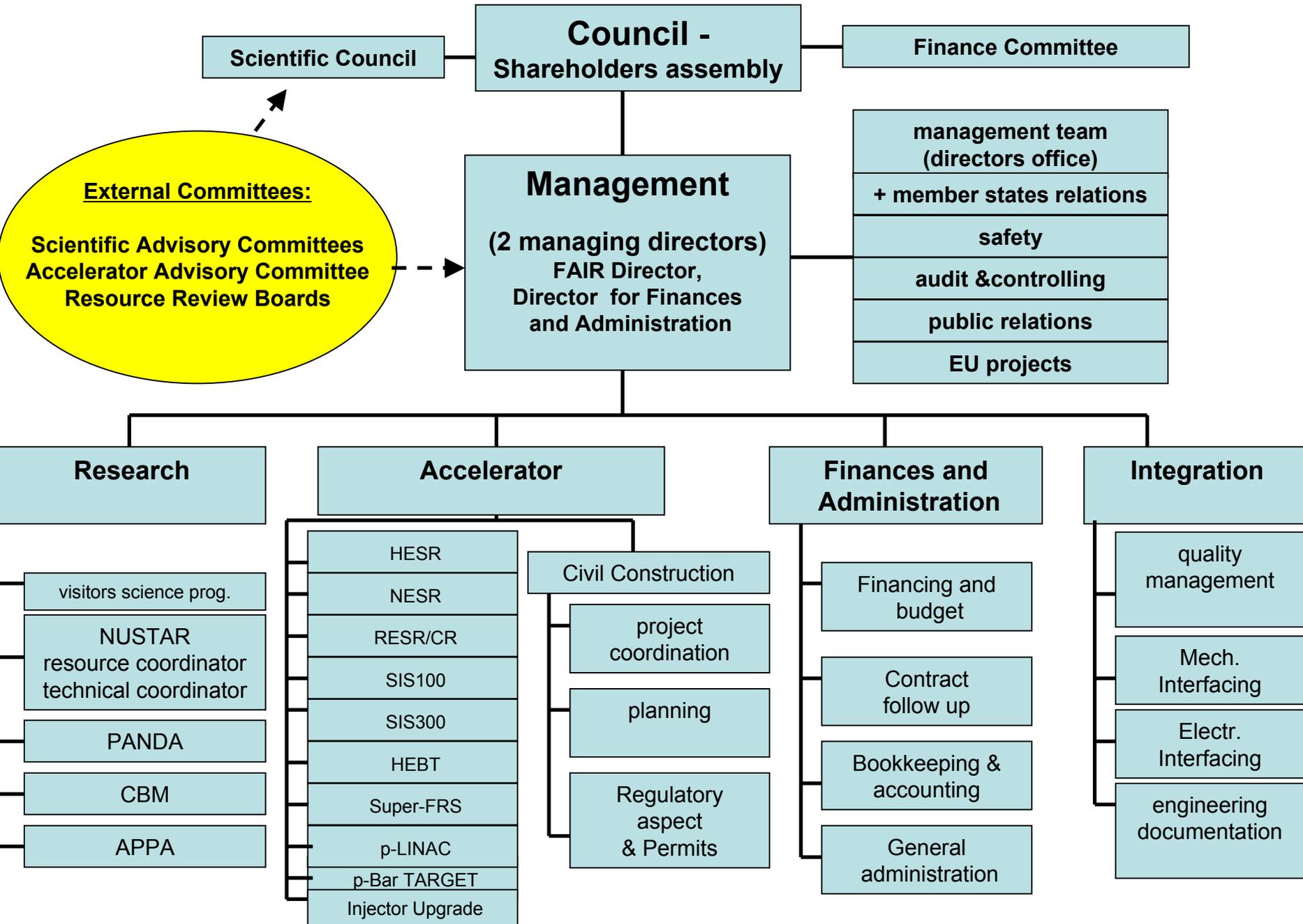
(contract(s) on specific rules and regulations between shareholders;
does not require notary public involvement)

plus additional bi-lateral, multi-lateral contracts, MoU's etc between
shareholders and other parties

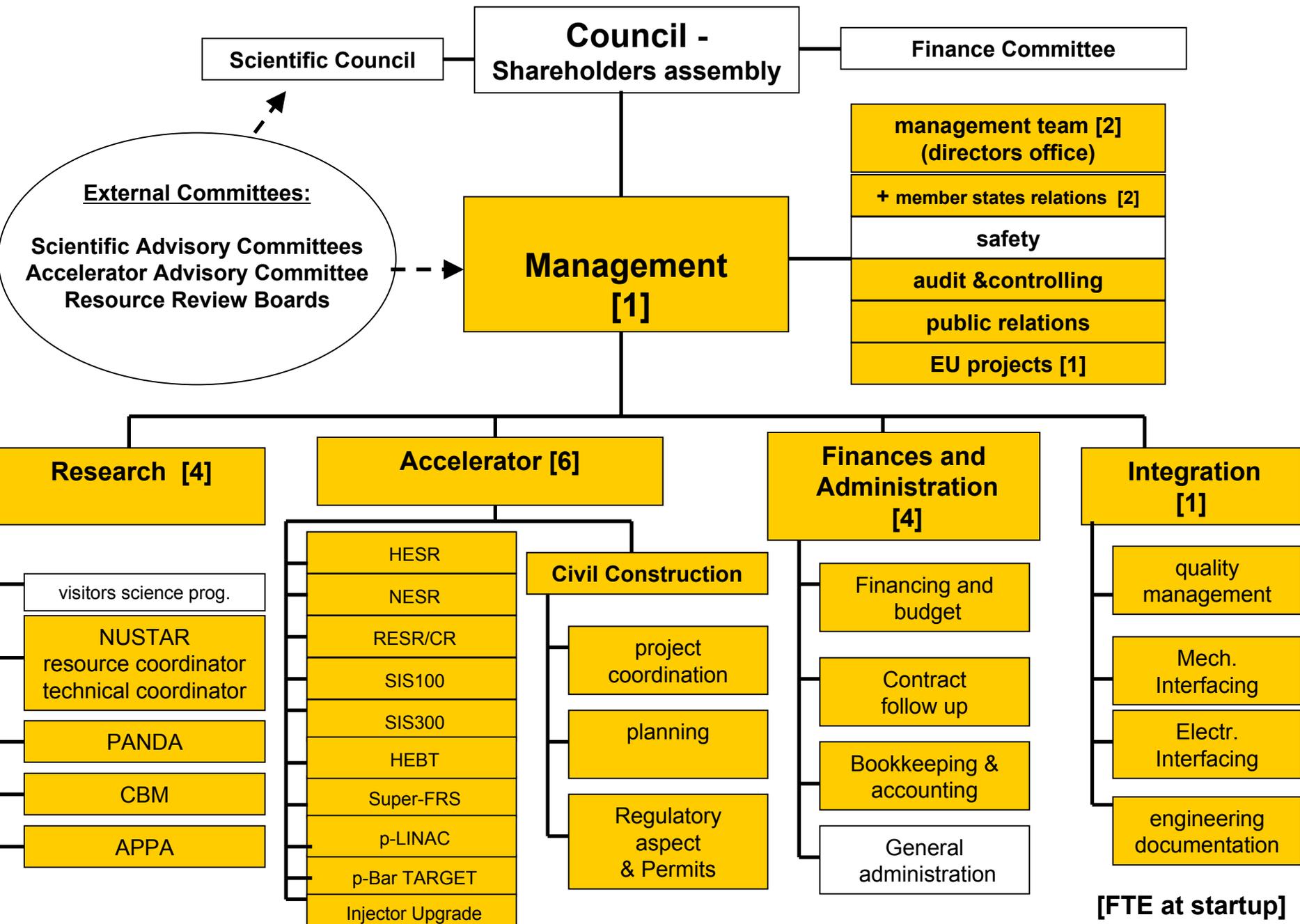
Proposed FAIR – Roadmap: Establishment of FAIR GmbH



DRAFT: Organizational plan of the FAIR GmbH



DRAFT: FAIR Joint Core Team



Project Status and next steps:

Next steps:

1. Finalization of by laws (AFI sub-group: national experts most welcome)
2. Establishment of the Joint Core Team (transition to FAIR GmbH);
calls coming soon (after October ISC)
3. Appointment of shareholders
4. Negotiations and final checks of legal documents

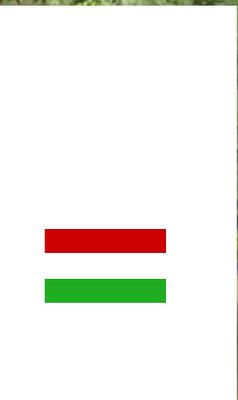
In 2015, 8 years and 1187 Million € later



GSI GmbH

+

FAIR GmbH







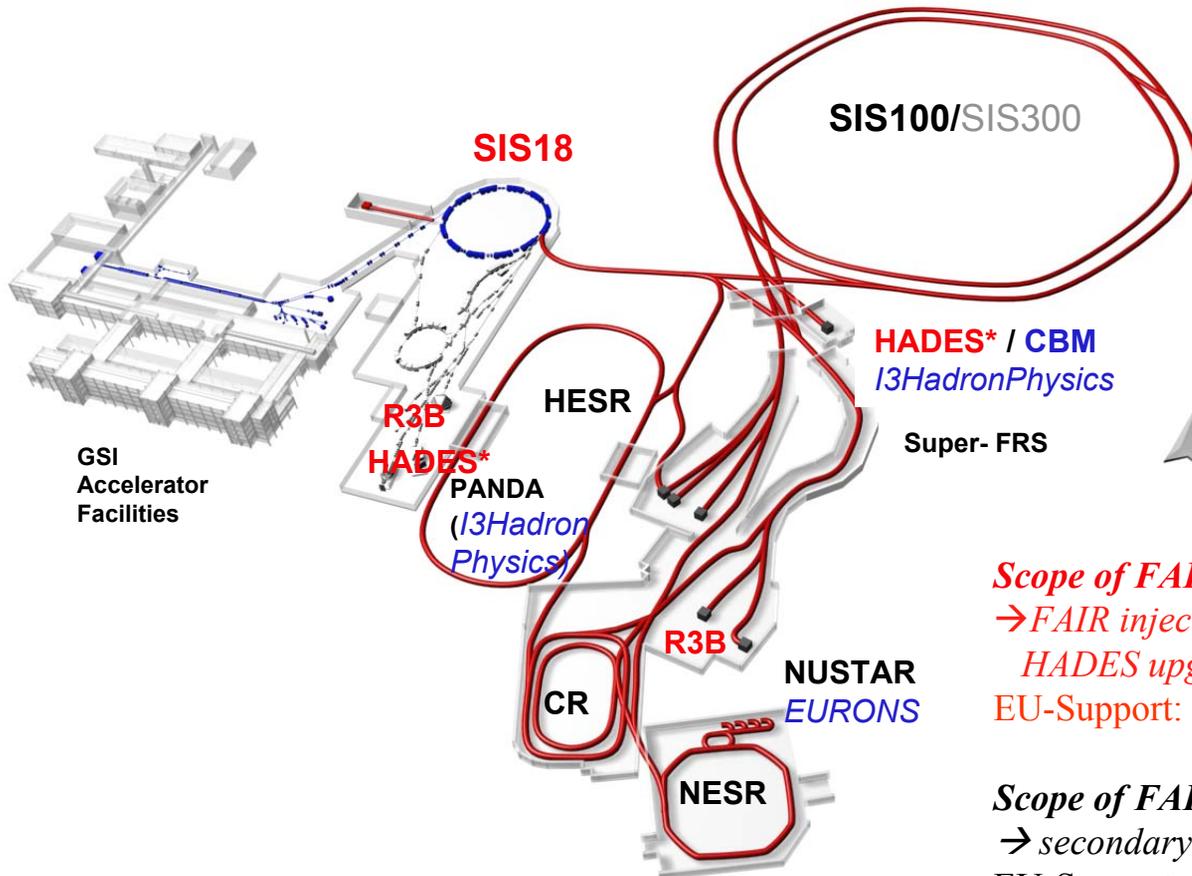
Preparation of FAIR EU FP7 Proposals

J. Eschke, GSI Darmstadt

- Resume FP6
- Strategy FP7

EU support for FAIR in FP6:

FAIR Construction of new Infrastructure (CNI) contract, FAIR Design Study, I3HadronPhysics, EURONS



Scope of FAIR CNI (DIRAC-Phase-1):
→ FAIR injector SIS18 intensity upgrade,
HADES upgrade + R3B magnet
EU-Support: 10,4 M€

Scope of FAIR Design Study (DIRAC-secondary-Beams):
→ secondary beams (RIB and Antiprotons)
EU-Support: 9 M€

Integrated Infrastructure Initiatives (I3):
I3HadronPhysics: FAIR related EU-Support: 10,8 M€
EURONS: FAIR related EU-Support: 2 M€

EU support for FAIR in FP6 very important for the preparatory phase of the FAIR project

FP6 EU contracts - FAIR related activities

EU contract	Coordinator	Total Budget [M€]	EU financing total [M€]	EU financing for GSI [M€]	EU financing FAIR related [M€]	FAIR related total* [M€]
FAIR Design Study "DIRACsecondary-Beams"	GSI	22	9,0	4,0	9,0	22
FAIR CNI (Construction of New Infrastructures) "DIRAC-PHASE-1"	GSI	100	10,4	5,2	10,4	100
EURONS , I3 on Nuclear Structure	GSI	35	14,0	2,6	2	7
HadronPhysics , I3	INFN	> 60	17.4	1.9	10.8	46.7
CARE , I3 on Accel. R&D	CERN	>30	15.2	0.4	0,4	0,8
EGEE Enabling Grids for E-science in Europe, I3	CERN	>20	10	0,2	0	0
EURISOL Design Study	CNRS	>18	9	0,4	0	0
CELLION Network of Excellence Studies on cellular response to targeted single ions using nanotechnology	Institute Nuclear Physics, Kraków		2,7	0,3	0	0
EUROTEV Design Study	DESY	>18	9	0,1	0,1	0,1
Total:				15,1	32,7	

* Adding the required institutional contribution of all participating institutes increases these amounts by more than a factor of two (own contribution > 50% for I3 and DS and > 90% for CNI).

Seventh Framework Programme (FP7)

FP7 2007 – 2013 Specific Programmes

1. Cooperation → *Collaborative trans-national research activities*

2. Ideas → *Basic research implemented through a European Research Council (ERC)*

3. People → *Marie Curie actions and other initiatives*

4. Capacities → *Research infrastructures, regions of knowledge, science and society, international cooperation,...*

Seventh Framework Programme (FP7)

originally proposed budget: ~73000 M€

FP7 EC (current prices)												
	Themes	Health	Biotech, Food, Agri- culture	Information Society	Nano, Materials, Production	Energy	Environ- ment	Trans- port	Socio- eco- nomic Re- search	Space and Security		
COOPERATION	Collaborative Research	8.317	2.455	12.670	4.832	2.931	2.535	5.940	792	3.960	44.432	
IDEAS	European Research Council										11.862	
PEOPLE	Marie Curie Actions										7.129	
CAPACITIES	Research Infrastructures	Research for, and by, SMEs		Regions of Knowledge	Research Potential		Science in Society		International Co-operation		7.486	
		3.961 (~2B€)	1.901	158	554		554		358			
JRC (EC)											1.817	
											Total	72.726

agreed budget: ~50000 M€

Research Infrastructures

Support to existing research infrastructures:

Transnational Access

Integrating activities

Research e-infrastructures

Support to new research infrastructures:

Construction of new research infrastructures

Design studies

New research infrastructures in FP7

Objective : *To promote the creation of new research infrastructures (or major upgrades of existing ones) of pan-European interest*

- **Design studies:** *To support exploratory awards and feasibility studies for new infrastructures (bottom-up)*
- **Construction of new infrastructures:** *To promote the creation of new research infrastructures based on the work conducted by ESFRI * on the development of a European roadmap for new research infrastructures*

* **ESFRI - European Strategy Forum for Research Infrastructures, <http://www.cordis.lu/esfri>**

FP7 Timetable

6 April 2005	Commission's proposal
21 September 2005	Specific programmes' proposal
December 2005	First reading at EP
January 2006 ?	Common position at Council
March 2006 ?	Second reading and approval at EP
June 2006 ?	Adoption
November 2006 ?	First calls for proposals
December 2006 ?	Launch Conference

delayed

- Call for Design Studies and CNI (January 2007), budget ~200 M€
Submission of DS proposals: spring 2007, budget: 1-3(5) M€
- Call for I3 Integrated Infrastructure Initiatives (~End 2007)

Recommendation of EC for FAIR FP7 applications

Meeting of NuPECC and EC in March 2006 in Brussels:

EC considers the FAIR project to be "(almost) funded" with a start of construction in 2007!

→ Therefore Design Study proposals should be initiated only for additions or upgrades of FAIR (not part of core project)!

Scope of FP7 FAIR Design Study proposals

FAIR Design Study Proposals for FP7:

- FLAIR (Facility for Low Energy Antiprotons and Ions)
- PAX & polarized Beams
- AIC (Antiproton Ion Collider)
- FAIR Future-Detector upgrade
- ?

budget: 1-3(5) M€



Thank you for your attention!



FP6 – Design Studies

★ → also in FP7 ★

Two aspects of Designstudies:

1. Feasibility studies

2. Technical preparatory work

FP6 – Design Studies

Feasibility studies

Feasibility studies will aim at laying the **conceptual foundations of a potential new** or enhanced infrastructure. This could consist in the basic feasibility study of a specific new facility or in exploring a **new fundamental technology** or technique underpinning a whole new concept. Alternatively, a feasibility study could cover the **detailed engineering design** of a proposed infrastructure, in particular in relation to its **most technologically advanced aspects** (i.e. excluding the detailed design of standard elements of the new infrastructure).

EU document (work program): http://www.cordis.lu/fp6/sp2_wp.htm

FP6 – Design Studies

Technical preparatory work

Technical preparatory work will cover the **development and testing of components, subsystems, materials or techniques (including dedicated software)** that are **critical for the future development of a new** or enhanced infrastructure.

Support will however **not** be provided for preparatory work based on existing or proven techniques or technologies, nor when it aims at reproducing available components or materials.

EU document (work program): http://www.cordis.lu/fp6/sp2_wp.htm

Preparation of DS proposal

select (now!):

- *"TASKS" and taskleaders*
- *participating institutes*
- *distribution of budget*
- *coordinator*
- *schedules for preparation of proposal*