

Preparation of FP7 Integration Activity Bid (2008)

Superconducting RF Acceleration Systems (SRF-AS)

Preparatory Group (13 people):

Olivier Brunner (CERN), Mariusz Grecki (Polish Universities), Susanna Guidicci (INFN), Peter MacIntosh (SFC), Trevor Linnecar (CERN), Olivier Napoly (CEA), Carlo Pagani (INFN), Vittorio Palladino (INFN), Dieter Proch (DESY), François Richard (IN2P3), Thomas Schilcher (PSI), **Alessandro Variola** (IN2P3), Rebecca Seviour (SFC)

Advisory Board :

Terry Garvey (ex. IN2P3, PSI)

CERN Meeting, 1st February 2007

Participants: Olivier Brunner, Trevor Linnecar, Olivier Napoly, Wolfgang Weingarten

Goal: find an agreement for the insertion of the “**General Purpose Infrastructure at CERN for R&D and Test of Superconducting Radio-Frequency Cavities and Cryomodules**”

Conclusions (excerpts):

- 1) the General Purpose Infrastructure (**GPI**) at CERN is fully supported and will be **beneficial to the SCRF community in Europe**.
- 2) the existing document describes only investments and operation costs at CERN. **To constitute a Joint Research Activity, it must be completed by the description of EU funded investments and operations at other associated institutes in Europe.**
- 4) the JRA will be organized into “**geographical**” **Work Packages** corresponding to facility sites; for instance: WP1 “GPI at CERN”, WP2 “SUPRATECH at Orsay-Saclay”, WP3 ..., etc...
- 5) the contribution of an associated institute to the JRA can occur in the 2 following models: **i.** the vertical model where the institute contributes in kind to an equipment destined to the CERN infrastructure **ii.** the horizontal model where the institute builds or operates an equipment on its site.
- 6) the overall equipment investments should be **coherent and avoid duplication**, with the CERN facility being central.
- 7) at each facility, the **recurrent operation base load (electricity, maintenance, etc...) shall be covered by the host institute** (for instance for the CERN facility, about 3.1 M€ over 4 years).
- 8) the **project related operation costs are not included in the JRA**. They shall be covered by the participating institutes, or by other JRAs.
- 9) there could be a parallel **TNA organization** to claim the project specific costs to the EC.
- 10) Wolfgang Weingarten is the nominee-coordinator of this JRA.

CERN Meeting, 1st February 2007

Additional Comments:

- Wolfgang Weingarten is ready to start coordinating the JRA and meet with concerned people.

- “Class 3” Equipment included in the 8.2 MCHF (~6.4 M€) total investment cost, cover :
 - 2K cryogenics installation for cryomodule test (<15m)
 - 1.3 GHz low RF power to run vertical tests
 - EP apparatus for single cell cavities
 - A SINGLE high power (few MW) pulsed klystron for an RF frequency at choice !!!

DESY Meetings, 20th February 2007

1st Meeting on SRF-AS IA organisation

Participants: Nicoleta Baboi, Eckhard Elsen, Lutz Lilje, Rolf Lange, Wolf-Dietrich Mueller, Olivier Napoly, Dieter Proch, Stefan Simrock, Waldemar Singer, ...,

Goal: check 1) the overall agreement on the JRA and NA organisation of the SRF-AS proto-“Integrated Activity”, and 2) the adequate integration of DESY proposed contributions.

Conclusions are in preparation (the following is preliminary) :

- global agreement is found on the JRA organisation
- FLASH will be a central facility for SCRF accelerator studies
- DESY will consider joining JRA5 “RF Test Infrastructure” (CMTB, Hall 3)
- distribution of LLRF activities over several WP and Institutes makes sense, with an integrated LLRF Networking Activity
- DESY proposed Work Packages may still evolve.
- plan of the FEL community to bid for FP7-IA is still unknown: it might house several Work Packages

2nd Meeting on CNI-PP coordination

Participants:, Eckhard Elsen, Lutz Lilje, Olivier Napoly, Dieter Proch, François Richard, Nick Walker

Goal: coordinate the technical activities of ILC CNI-PP bid with SRF-AS IA

Conclusions are in preparation

- coordination is mandatory and will be beneficial to both activities over the 2008-2012 period
- the JRA5 “RF Test Infrastructure” is a key element in the programme

Daresbury Meeting, 28th February 2007

Participants: Amos Dexter, Philippe Goudket, Peter McIntosh, Roger Jones, Alexander Kalinin, Olivier Napoly, Shrikant Pattalwar, Rebecca Seviour.

Goal: check 1) the overall agreement on the JRA and NA organisation of the SRF-AS proto-“Integrated Activity”, and 2) the adequate integration of UK proposed contributions.

Conclusions (excerpts):

- 1) at the present stage, two UK institutes are concerned by the preparation of the FP7-IA bid, namely the **AsTec Daresbury Laboratory (DL)** and the **Cockcroft Institute (CI)**.
- 2) the proposed **JRA organisation allows to integrate the currently identified UK contributions** on 1) ILC in a Work Package “Crab cavities”, and 2) ERL in the Work Package “1.3 GHz CW Cryomodule” studies, both within the JRA2 “Cavity Prototypes”.
- 4) the participation of DL and CI to the JRA5 “**RF Test Infrastructures**” through a **Daresbury based Work Package will have to be confirmed**.
- 5) CI will define its participation to the Work Package “EP and surface analysis” in JRA1 “High Gradient Cavities” to include **fundamental surface investigation activities**.
- 6) CI will define its participation in the DESY WP8 “HOM beam monitors” included on the Work Package “FLASH at DESY” of JRA4 “Accelerator, Beam and Cryogenic Studies”.
- 7) neither DL nor CI is considering proposing a **Trans National Access** activity.
- 8) the **distribution of the LLRF technical activities over several Work Packages is practical** and based on reason. The necessary multi-laboratory scientific exchange on the field of LLRF will be included as a Networking Activity, with UK participation.
- 9) a multi-laboratory **Networking Activity upon “RF Cavity Design”** should be supported, with UK participation.

Other Contacts

- with Bernard Rousset (CEA Grenoble) about the “Slope Cryogenics” proposal : his answer is pending.
- With Jochen Teichert (FZ Rossendorf)
 - Very interesting programme of Beam and Accelerator Studies at ELBE, with ~50% availability of the SCRF Gun because the thermo-ionic gun will stay in place.
 - Accelerator developments programme includes:
 - Gun emittance compensation methods
 - LASER Pulse shaping and noise reduction
 - SCRF gun for polarised electrons
 - ...

**Proposal for a JRA Structure
(3nd Iteration, almost agreed)**

Superconducting RF Acceleration Systems (SRFAS)

JRA1 : High Gradient Cavities

JRA2 : Cavity Prototypes

JRA3 : Thin Films

JRA4 : Accelerator, Beam and Cryogenics Studies

JRA5 : RF Test Infrastructures

Joint Research Activities (1/2)

	JRA1 : High Gradient Cavities			JRA2 : Cavity Prototypes					JRA3 : Thin Films		
	Single Crystal	EP and surface investigations	Ancillaries	Crab Cavities	3.9 GHz Cavities	1.3 GHz CW cryomodule	RF Gun Cavity	101 MHz Nb/Cu □/4	UHV Arc Coating Cone	UHV Arc Coating Cylindrical	Thin Film Photo-cathodes
CCLRC Daresbury Cockcroft Inst.		X		C1 C1	X ? X ?	C2 C2	X ? X ?				
CEA Saclay Grenoble		X						X?	X ?		
CERN								X			
CNRS IPN Orsay LAL Orsay LPNHE Paris			X								
DESY	D5				D6		D1		X ?	X ?	X ?
German Inst. Darmstadt U. Erlangen U. Max Born Inst. Rossendorf FZR Wuppertal U.		X D5 D5					R4				
INFN + Inst. Frascati Milano + Univ. Legnaro Napoli CNR Pozzuoli Roma 2 + Univ.			X				D1 ? R4		X ? X ? X X	X ? X ? X	X X
Polish.Univ. Lodz Swierk Warsow								X	X	X	
PSI											

Joint Research Activities (2/2)

	JRA4 : Accelerator, Beam and Cryogenics Studies			JRA5 : RF Test Infrastructures			
	FLASH at DESY	ELBE at FZ Rossendorf	Cryogenics at Grenoble	GPI at CERN	SupraTech IdF	TTF at DESY (tbc)	Cockcroft (tbc)
CCLRC Daresbury Cockcroft Inst.	D4 ? D8	R3 ?					X X
CEA Saclay Grenoble	D8		X		X		
CERN			X ?	X			
CNRS IPN Orsay LAL Orsay LPNHE Paris	D3 ? D3 ?				X X		
DESY	D3, D4, D7, D8					D2, D6	
German Inst. Darmstadt U. Erlangen U. Max Born Inst. Rossendorf Wuppertal Univ.	D7	R1 ? R1, R3, R5					
INFN Frascati Milano + Univ. Legnaro Napoli CNR Pozzuoli Roma2 + Univ.	D3 ?	R1?, R3 ?					
Polish.Univ. Lodz Swierk Warsow	D3 ?						
PSI	D3 ?						

UK Workpackages	
C1 Crab idem	LLRF cryomodule
idem	couplers
idem	tuner
C2 ERL idem	cryomodule LLRF
idem	inpur coupler

DESY Workpackages	
D1	SCRf Gun
D2	CW IOT
D3	LLRF
D4	FEL synchro
D5	single crystal
D6	3.9 GHz cav.
D7	3 GHz LOLA
D8	HOM

FZR Workpackages		
R1	Laser PS	Novel AS ?
R2	large grain	= D5
R3	emittance compensation	
R4	polarized SCRf gun	
R5	SCRf gun experiments	

Proposal for a NA Structure
(3nd Iteration, not agreed yet)

Superconducting RF Acceleration Systems (SRFAS)

One or Two Networking Activities, including:

- **Scientific Orientation and Planning**
- **Dissemination, publications**
- **Organisation of meetings**
- **LLRF Activities**
- **RF Cavity Design**
- **RF Test Programmes**

Networking Activities

	NA1	NA2 : Networking Activites					
	IA Management	Scientific Orientations and Planning	Dissemination	Meeting organisation	LLRF	RF Cavity Design	RF Test Programme
CCLRC Daresbury Cockcroft Inst.							
CEA Saclay Grenoble							
CERN							
CNRS IPN Orsay LAL Orsay LPNHE Paris							
DESY							
German Inst. Darmstadt U. Erlangen U. Max Born Inst. Rossendorf FZR Wuppertal U.							
INFN + Inst. Frascati Milano + Univ. Legnaro Napoli CNR Pozzuoli Roma 2 + Univ.							
Polish.Univ. Lodz Swierk Warsow							
PSI							

Trans National Access

- CERN Infrastructure
- DESY FLASH
- SUPRATECH Ile de France
- ...

No progress so far

Next Steps

- **Local Meetings :**
 - 21 March : Meeting with France Representatives
 - 28 March : Meeting with Poland Representatives
 - ?? March : Meeting with Italy Representatives
- **Plenary Meeting:** 3 April (tbc) 2nd meeting of the SRF-AS Working Group
 - To finalize JRA and NA organisation,
 - To review TNA status,
 - To identify Activity leaders.
- **Mid-May 07 :** formulate Letters of Intend for the JRA and NA
 - Description of the work
 - Participating institutes
 - Rough costs (total < 45 M€, including 15 M€ from EC)
 - Work Package leaders
 - Priorities agreed among the SRF-AS Group
- **Then :** Coalesce in the ESGARD Agenda
 - Spring 07 : Selection of R&D items and definition of the priorities
 - Summer 07 : Decision upon the number of IA
 - Fall 07 : Beginning of the proposal write up.