

# Short document describing the modifications to the initial FP7-EuCARD Proposal

---

## Introduction and context

With a score of 14.5/15, the EuCARD proposal has been accepted for negotiation. With respect to its budget, the evaluation of the reviewers note that “*There is considerable potential for cost-savings in the SRF work (WP11)*”. Interpreting this statement as requiring a significant budget reduction by 25% to 50% of this WP, the total EuCARD EC funding would be reduced by 8 to 16%. The negotiation mandate indicates however a maximum funding of 10 M€ instead of the 15M€ assumed in the proposal. Hence, the modifications to be applied to the initial proposal ought to go much beyond the reviewers evaluation. We have been trying as much as possible, taking the numerous constraints, to retain and follow closely the spirit of their evaluation. In this proposed modification, an essential aspect has been to only retain tasks at a viable funding level, forming a coherent programme, while preserving globally the participation of most partners and a correct balance over Europe, as an essential condition of success. In this exercise, the largest laboratories and the coordinating laboratory first, have made special efforts to prevent dramatic consequences for smaller institutes and industrial firms, whose presence is acknowledged by the reviewers.

The purpose of this short document, preceding the “Description of Work” is to

- explain the strategy of budget reduction and how it follows the requirements of negotiation mandate.
- present the resulting budget per WP and tasks, with considerations on beneficiaries and deliverables
- analyse and answer the part of the negotiation mandate dedicated to lasting structures and long-term sustainable integration
- give the list of suppressed tasks, acknowledged by the reviewers as world-leading, to be the subject of a subsequent call in 2010.

## Strategy for budget reduction

The EuCARD EC funding was reduced from 15 M€ to 10 M€ in five successive passes:

1. The goal of the first pass was to implement the explicit call of the Reviewers for savings: “*There is considerable potential for cost-savings in the SRF work (WP11), which is requesting the lion’s share of the EC funding*”. The budget of the SRF WP11 has thus been reduced so as to obtain **comparable funding for the three main accelerator R&D branches** in this proposal: HFM (WP8), NCLinac (WP10) and SRF

(WP11). To achieve this reduction, the two SRF tasks 11.2 and 11.10 were suppressed. The selection was based on maximum eligibility, irrespective of the quality, acknowledged as world-leading by the Reviewers.

2. In the second pass, two TA's were suppressed out of the 4 proposed. This takes into account the very large existing access to accelerators by some 10000 end users. In the original proposal, the additional technical TA's were fully sponsored by the laboratories, i.e. their operating cost fully supported by the owners of the facilities, with the exception of a small EC participation to the management of the access. The proposed TA's are essential tools for the JRA's activities. With a considerable cut on the JRA's, it becomes impossible to sponsor free access anymore. Nevertheless, these facilities will remain naturally accessible to the smaller institutes, partners in the JRA's, as underlined by the reviewers.
3. In a third pass, all JRA's were scrutinized for suppression of full tasks by the coordination team. The tasks suppressed are: HFM WP8 task 8.6, NCLinac WP10 task 10.6. The budget of MGT (WP1) is totally suppressed and fully supported by the coordinating institute.
4. In a fourth pass, the budget of some tasks was reduced by reducing their scope and deliverables, by reducing some to 3 years or by combining two tasks with some synergies:
  - a. Reduction by 22% of WP2 (Dissemination network) by reducing the scope (prospective meetings with industry suppressed, funding of outreach reduced)
  - b. Reduction to three years of funding for the WP7 TA-STFC
  - c. Reduction to 3.5 years of task 8.2
  - d. Reduction by 15% of task 8.5
  - e. Reduction by 25% of WP9 ColMat, mostly affecting one partner (CERN)
  - f. Combination of tasks 11.3 and 11.4 into a single task to exploit synergies and reduction by 25%
  - g. Reduction by 16% of task 11.5
  - h. Reduction by 30% of task 11.6 (one subtask suppressed)
  - i. Reduction by 20% of task 11.8
  - j. Introduction of a small task 11.10, preserving important R&D carried out in the former 11.10 task now suppressed.
5. Finally, a flat cut of about 12% was applied to all those tasks whose budget was not formerly reduced, with the exception of the priority tasks identified by the reviewers (8.3 and 8.4).

It should be underlined that none of the tasks suppressed or reduced would be pointed at by the Reviewers as deserving less interest.

## Summary of the new funding of the Work packages

<i>Task</i>	<i>Total cost</i>	<i>EC funding</i>	<i>Reduction of EC funding vs proposal</i>
<b>MGT</b>	<b>889,100 €</b>	<b>- €</b>	-100.00%
<b>DCO</b>	<b>253,700 €</b>	<b>137,300 €</b>	-22.73%
<b>NEU2012</b>	<b>314,300 €</b>	<b>279,800 €</b>	-11.62%
<b>AccNet</b>	<b>759,600 €</b>	<b>594,400 €</b>	-8.50%
<b>TA-CERN</b>	<b>325,900 €</b>	<b>59,500 €</b>	-76.95%
<b>TA-DESY</b>	<b>- €</b>	<b>- €</b>	-100.00%
<b>TA-STFC</b>	<b>1,138,100 €</b>	<b>222,100 €</b>	-24.98%
<b>HFM</b>	<b>6,488,700 €</b>	<b>2,063,700 €</b>	-22.24%
<b>CoIMat</b>	<b>3,936,900 €</b>	<b>1,284,600 €</b>	-25.00%
<b>NCLinac</b>	<b>6,822,700 €</b>	<b>2,005,400 €</b>	-24.40%
<b>SRF</b>	<b>7,723,800 €</b>	<b>2,418,200 €</b>	-50.08%
<b>ANAC</b>	<b>3,122,400 €</b>	<b>935,000 €</b>	-12.61%
<b>TOTAL</b>	<b>31,775,200 €</b>	<b>10,000,000 €</b>	-33.31%

One work package disappears (TA FLASH). Other work packages are reduced in a range of 8.5% to 77% (100% for the management).

## Detailed funding of the tasks

WP #	Task	Coord.	total cost		EC funding		Cut vs proposal
			task	WP	task	WP	
1	<b>MGT</b>	CERN		889,100 €		- €	-100.00%
2	<b>DCO</b>	WUT CERN		253,700 €		137,300 €	-22.73%
	<b>NEU2012</b>	INFN		314,300 €		279,800 €	-11.62%
3	3.1 Coordination and communication		106,700 €		72,200 €		-11.63%
	3.2 Use of existing nu facilities		94,100 €		94,100 €		-11.63%
	3.3 Roadmap to the Future		113,500 €		113,500 €		-11.62%
	<b>AccNet</b>			759,600 €		594,400 €	-8.50%
4	4.1 Coordination and communication	CERN LAL	302,000 €		157,000 €		-11.60%
	4.2 EuroLumi Beam physics, magnets & collimation	CERN	237,700 €		217,500 €		-11.59%
	4.3 RFTech RF design & technologies	LPSC TUL	199,800 €		199,800 €		-11.59%
	4.4 SRF Infrastructures	CERN,	20,100 €		20,100 €		0.00%
	<b>TA-CERN</b>			325,900 €		59,500 €	-76.95%
5	5.1 Access management		22,600 €		21,500 €		-76.95%
	5.2 CryoMagNet		-€		-€		-100.00%
	5.3 HiRadMat	CERN	303,300 €		38,000 €		-11.63%
	<b>TA-DESY</b>			-€		-€	-100.00%
6	6.1 Access management		-€		-€		-100.00%
	6.2 FLASH-TTF	DESY	-€		-€		-100.00%
	<b>TA-STFC</b>			1,138,100 €		222,100 €	-24.98%
7	7.1 Access management		35,600 €		35,300 €		-24.96%
	7.2 MICE	RAL	1,102,500 €		186,800 €		-24.98%
	<b>8. HFM</b>			6,488,700 €		2,063,700 €	-22.24%
8	8.1 Coordination and communication	CERN CEA	286,000 €		101,100 €		-22.23%
	8.2 Support studies	WUT	1,957,200 €		662,200 €		-15.00%
	8.3 Models	CEA	1,679,400 €		518,400 €		0.00%
	8.4 Very high field insert	CNRS	1,427,800 €		431,600 €		0.01%
	8.5 HT sc link	CERN	607,800 €		191,300 €		-14.98%
	8.6 Sc wigglers for CLIC-DR	CERN	-€		-€		-100.00%
	8.7 Sc undulators	STFC-DL	530,500 €		159,100 €		-11.61%
	<b>9. ColMat</b>			3,936,900 €		1,284,600 €	-25.00%
9	9.1 Coordination and communication	CERN GSI	173,900 €		59,700 €		-25.01%
	9.2 Modelling, Material tests for hadron beams	CERN	2,063,000 €		668,800 €		-25.00%
	9.3 Collimator prototyping & testing for hadron beams	CERN	1,700,000 €		556,100 €		-25.00%
	<b>10. NCLinac</b>			6,822,700 €		2,005,400 €	-24.40%
10	10.1 Coordination and communication	RHUL CERN	259,000 €		96,800 €		-24.38%
	10.2 NC high gradient cavities	CERN	2,653,800 €		732,300 €		-11.58%
	10.3 Linac & FF stabilization	LAPP	1,865,400 €		559,700 €		-11.58%
	10.4 BDS (laser wire)	RHUL	1,099,400 €		332,100 €		-11.58%
	10.5 Drive beam phase (monitor)	INFN	945,100 €		284,500 €		-11.59%
	10.6 DR vacuum (coatings, NEG, e-cloud)	CERN	-€		-€		-100.00%
	<b>11: SRF</b>			7,723,800 €		2,418,200 €	-50.08%
11	11.1: SRF Coordination & Communication	DESY CEA	317,100 €		115,100 €		-50.06%
	11.2: Single Crystal Cavities	DESY	-€		-€		-100.00%
	11.3: SC Cavities for Proton Linac, Electro-polishing & Surface Investigations	CEA	1,747,200 €		524,200 €		-25.00%
	11.5: LHC Crab Cavities	UNIMAN	1,215,300 €		364,600 €		-16.50%
	11.6: Thin Films	CERN	995,400 €		315,700 €		-29.74%
	11.7: HOM Distribution	DESY	1,018,500 €		305,600 €		-11.57%
	11.8: LLRF at FLASH	DESY	1,472,700 €		522,400 €		-20.01%
	11.9: SCRF Gun at ELBE	FZD	562,100 €		152,000 €		-11.57%
	11.10 SRF test infrastructures	CERN	-€		-€		-100.00%
	11.10 Coupler development at LAL	LAL	395,500 €		118,600 €		-92.50%
	<b>12. ANAC</b>			3,122,400 €		935,000 €	-12.61%
12	12.1 Coordination and communication	INFN	153,700 €		43,700 €		-12.60%
	12.2 crab waist	INFN	1,160,800 €		348,200 €		-12.93%
	12.3 FFAQ (EMMA)	STFC-RAL	1,100,600 €		330,900 €		-12.92%
	12.4 Instrumentation for plasma wave acceleration	LOA	707,300 €		212,200 €		-11.58%
				31,775,200 €		10,000,000 €	-33.31%

It can be observed that the final results of the strategy of cuts described in the former section fulfills the two priorities of the negotiation mandate (highest priority for the high field magnet and insert, considerable savings in SRF-WP11).

The new task budgets were agreed with the task coordinators. A new detailed budget for each beneficiary in each task is in work, requiring a detailed break-down of the budget cut and the agreement of the respective management at the level of each task participant. This is especially critical in EuCARD where the funding level by EC drops from 30% to about 26% in the best cases for tasks suffering only the flat cut (pass 5).

One beneficiary (ESRF) leaves the consortium after the only task he was involved in was cancelled. One to four other beneficiaries might withdraw.

As far as possible, tasks only concerned with the flat cut of 12% will strive keeping their deliverables. Tasks suffering larger cuts will reduce the deliverables. The strategy of selective suppression of tasks shall prevent endangering the major deliverables of the remaining tasks, preserving the coherence of the I3.

## **Lasting structures and long-term sustainable integration**

This important aspect and condition of future development in the field has been underlined by the reviewers. In this short document, we clarify the situation and how the impact of EuCARD can contribute to this goal.

As underlined by the reviewers, the development of large accelerators can only be carried out at a European or Global level. This requires indeed the sharing of common goals and the establishment of long-lasting structures to support the implementation of this vision. Even though the latter only start to appear at a Global level, important initiatives have been and are being taken and reinforced in the last years to orient the community in this direction, at three different levels:

### **1) Policies and definition of common goals**

In the field of High Energy Physics, a first strategic initiative was the creation in 1963 of ECFA, the European Committee for Future Accelerators, on the initiative of V. Weisskopf, then CERN Director-general. The mandate of ECFA

<http://committees2.web.cern.ch/Committees2/ECFA/Welcome.html>

clearly addresses the issues of coordinated long-range planning and collaborative effort between laboratories and university institutes. More recently, under the impetus of R. Aymar, CERN Director General, the CERN Council, representing the 20 Member States, has recently taken up the important responsibility, defined in its mandate, to define the European Strategy for Particle Physics. The instruments of this action are the (one-off) CERN Council Strategy Group, which produced a strategy paper

[http://council-strategygroup.web.cern.ch/council-strategygroup/Strategy\\_Statement.pdf](http://council-strategygroup.web.cern.ch/council-strategygroup/Strategy_Statement.pdf)

endorsed by a special session of Council in Lisbon in 2006, and the (permanent) European strategy Session of the CERN Council, which met for the first time in December 2007. A permanent secretary was very recently appointed. Following the reinforcement of links between CERN and the European Commission, both ESFRI and the EC have agreed to recognize the European Strategy for Particle Physics decided by the CERN Council as the authentic particle physics component of the ESFRI roadmap. In the field of Nuclear Physics

and Light Sources, ESFRI has been playing its full role, defining the European priorities for these disciplines.

## **2) International studies and projects**

With clear definition of common goals and priorities, the new projects are being created as international collaborations (ILC, XFEL, FAIR) or have been recently or are being transformed into such collaborations (CLIC, SLHC), from the early phases of conceptual study and R&D. At this level, the partners act at a global technical level, taking full responsibility for providing complete accelerator systems based on their respective expertise. This is precisely where the European “Construction of New Infrastructure - Preparatory Phase” actions assist the formation of such collaborations.

## **3) CARE, EuCARD.**

Like CARE, EuCARD acts at the execution level, in direct contact with the scientists and engineers of the various partners. Its EC funding is at the level of a few per mil of the laboratories budgets, i.e. not significant in terms of investments, whether in capital or human resources. However, this funding is highly leveraged, totally focused on concrete R&D collaborations between institutes (collaborative studies or constructions of accelerator systems), working or exchanging their expertise to fulfill genuinely common scientific goals. In the search of integrating the European effort, “doing together” is certainly as important as defining common goals. It fosters a culture of collaboration that can gradually create the conditions for a more coherent and effective sharing of the work to face very large projects far exceeding the possibilities of any partner.

Based on these considerations, taking account that the field has a long-standing tradition of networks and mutual access to infrastructures, EuCARD is focused on common scientific and technical ventures. The collaborations are at the level of tasks or subtasks inside the JRA's, with the goal of exploiting or creating synergies on the long term.

Practical tools could further foster collaborations, such as:

- The creation and maintenance of an expertise directory, whereby the detailed capabilities of the partners would be collected and kept up-to-date to serve as a knowledge base in identifying future collaborations,
- The development or choice of an open, quality videoconference tool for “tele-office discussions”, using the office computers, uniform over all partners, to facilitate exchanges between individuals or small teams working on common projects; it could be developed as a joint venture with other partners, e.g. SLHC-PP,
- The creation of long-lasting web sites supporting collaborations

The EuCARD coordination will do all efforts to induce actions in these fields by the laboratories with the goal of lasting actions and support.

As another step in the creation of sustainable integration, it is important to remember that both CARE and EuCARD were proposed under the umbrella of ESGARD, the European Strategy Group for Accelerator R&D, and that the CARE and present EuCARD coordinators are members of ESGARD. This ensures that EuCARD remains well integrated in the

complex landscape of Particle Physics, Nuclear Physics and Light Source, avoids redundant initiatives and make best use of the integration of most of the actors in the field. To further enhance the leverage effect of EuCARD on lasting infrastructures, we shall propose to the relevant political authorities to consider the EuCARD coordinator for participation at the appropriate levels. EuCARD would then be used as a proposition force and a test bench for collaborative tools.

## Suppressed tasks candidate for later funding

The following tasks have been suppressed or largely reduced. They are all consistent with the declared priorities of High Energy Physics, Nuclear Physics and Light sources, as described in section 1.1.3 of the Proposal and keep the strong support of the community for later funding:

1. WP5 (TA), task 5.2 (CryoMagNet): these are unique facilities for test and measurement of super-conducting magnets and cables.
2. WP6 (TA) (FLASH): FLASH is a unique last generation light source facility offering versatile test possibilities for various accelerator science technologies.
3. WP8 (JRA) task 8.6 (Damping wigglers): the parameters of this wiggler are at the edge of the technology, with several possible uses, the first one in the ANKA machine at FZK. This task is itself a collaboration between CERN and a smaller Institute FZK that, through this collaboration, takes part in a significant challenge in accelerator sciences, and has lately reiterated its strong interest and commitment of matching funds.
4. WP9 (JRA) Collimation and materials: the 25% cut in this field was largely faced by a decrease of the CERN funding to allow fruitful collaboration with several smaller Institutes with expertise in materials. This funding is necessary and shall have to be found elsewhere.
5. WP10(JRA)task 10.6 (Damping ring vacuum): film coatings to reduce the electron secondary yield and the occurrence of electron clouds is a common challenge to several existing and planned accelerators and deserves active collaboration.
6. WP11(JRA) task 11.2 (Single crystal cavities): This technology would open the way to more robust SC cavities with more reproducible performance for accelerators using sc cavities for acceleration.
7. WP11(JRA) tasks 11.3 & 11.4 (EP processing and SPL cavities): these tasks cut by 25% are strongly related to the LHC upgrade thru the upgrade of its injector complex (flexibility in forming the beam structures, higher intensities and brilliance, reliability)
8. WP11(JRA) task 11.10: A better integration and upgrade of the various SC RF tests infrastructures is a prerequisite for an economical development of sc RF acceleration. This task has been suppressed and transformed into a network to better define the goals and the roadmap in preparation of a concrete implementation.

DRAFT