VELLA
(Virtual European Lead LAboratory)

Contract Number 036469

PROJECT PRESENTATION

Start date of project: October 1st, 2006 Duration: 36 months

Organisation name of lead contractor: ENEA, *Ente per le Nuove Tecnologie, l'Energia e l'Ambiente*

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

VELLA OBJECTIVES

TheVELLA (Virtual European Lead LAboratory) initiative is an Euratom FP6 project which has the ambitious intent to create a virtual laboratory for lead technologies. More in detail, the final goal of the project is to create a common research area among the European Union and its associate countries (such as Switezland) (EU) in the field of lead technologies for nuclear applications.

Due to its attractive properties, in fact, a wide use of pure lead, as well as its alloys (such as lead-bismuth, lead-lithium), is foreseen in several nuclear-related fields: it is studied as coolant for critical and sub-critical nuclear reactors, as spallation target for neutron generation and for tritium production in fusion systems.

Given this foreseen future extensive use of lead in nuclear systems, a deep understanding of its physical properties and engineering applications is not only desirable, but absolutely necessary. As a consequence, given the quite limited nowadays experience , large efforts both at national level as well as within the EU are dedicated to the heavy liquid metal (HLM) technologies.

In particular, the European Union is promoting several large R&D programmes, among which we can mention EUROTRANS- DEMETRA (*EUROpean research programme for the TRANSmutation of high level nuclear waste in Accelerator Driven Systems-DEvelopment and assessment of structural materials and heavy liquid MEtal technologies for TRAnsmutation systems*), ELSY (*European Lead-Cooled System*) and VELLA, which major objective is to integrate the existing European infrastructures, developing synergies and complementarities among the laboratories and the research groups.

As already hinted, the driving idea of VELLA is to homogenize the European research area in the field of lead technologies for nuclear applications in order to produce a common platform of work which continues also after the end of the initiative.

Above all, VELLA has the ambitious intent to both create a network of all the principal laboratories and to strongly connect the different groups of experts, in order to have a common definition of the good operational practices and to promote the exchange of the scientific results by means of appropriate and innovative tools and procedures, creating a common platform

It also has the significant objectives to promote the access to the main existing facilities in the EU to different specialist groups, support the technological development and the qualification activities and create a homogenous European "scientific community", organized to support all the required technological challenges and the necessary research requirements.

In this framework, detailing the abovementioned goals, VELLA is articulated in *Networking Activities* (NA), *Transnational Accesses* activities (TA) and *Joint Research Activities* (JRA).

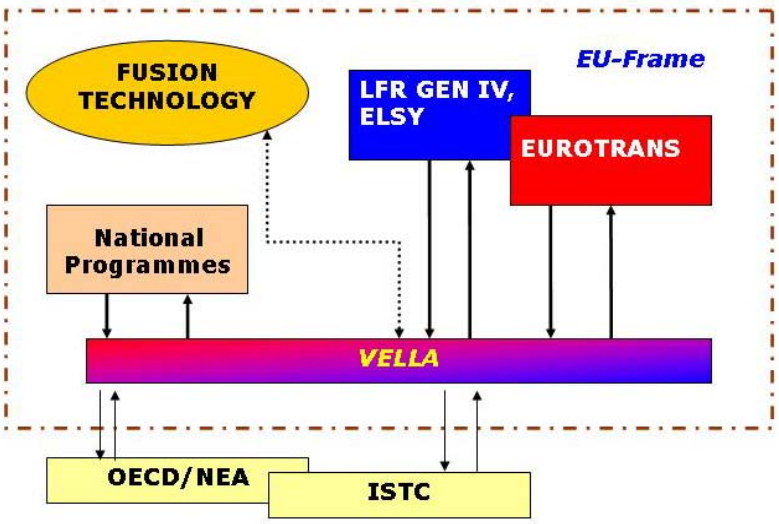

Figure 1. The European research area in the field of HLM technologies

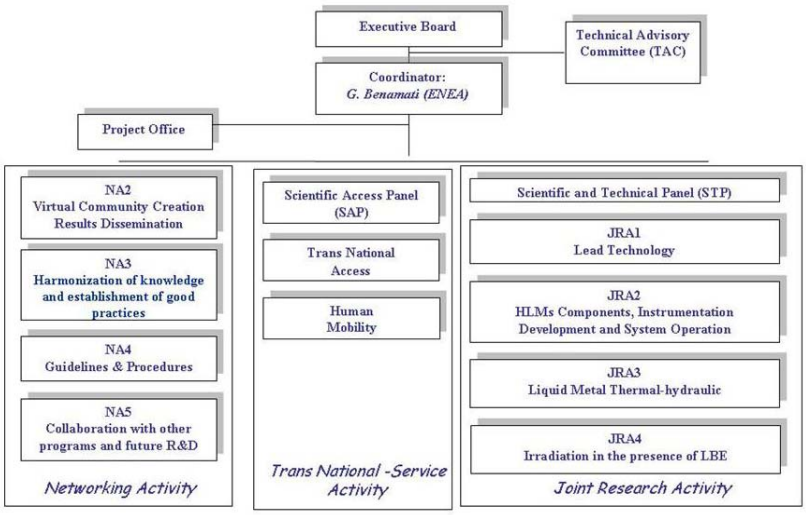

Figure 2: VELLA management structure

The scope of the NA is to create a virtual community of researchers, to define common standards and protocols for the use of the facilities and to interact with the programmes and the institutions operating in this field. The objectives of the TA are to promote the access of researchers, universities and firms to the existing infrastructures and knowledge, in order to increase the competitiveness of the European industry, to train the researchers in using the EU infrastructures during the three years duration of the project and to help the human mobility between and towards the laboratories. The JRA have the goals to create a base of knowledge on lead technologies, develop and operate HLM components and instrumentations, study the HLM thermal hydraulics.

Networking Activity 1: "Management of the Consortium Activities"

The management of VELLA entails mainly the co-ordination of all the technical activities of the I3, the legal, contractual, financial and administrative management, the maintainment of the contacts with the Commission, the steering and monitoring of the time schedule, the budget, the deliverables and the milestones, the preparation of meetings and the implementation of dissemination measures, the co-ordination of the knowledge management, the realization of the required documentation, the dissemination and publishing of the results.

In this framework, in order to perform the abovementioned activities, a management structure articulated as in figure 2 has been set up.

The Executive Board (EB) is the Consortium decision-making and arbitration body. The Technical Advisor Committee (TAC) is the body responsible for scientific advices and recommendations covering the topics of the Project. The Scientific Access Panel (SAP) is the body responsible for the selection of the accesses to the infrastructures during the whole duration of the Project, the selection of the Human Mobility (HM) applications, the monitoring of the accepted actions. The Scientific and Technical Panel (STP) is the body managing the Joint Research Activities within the project execution. The Co-ordinator is the single point of contact between the EC and the Consortium and it is responsible for the project management. The Project Office (PO) is the body which manage the administrative, legal, financial and other non-technical aspects of the Project and assist the abovementioned bodies and the Coordinator in their activities.

Networking Activity 2: "Virtual community creation and results dissemination"

The activity, through the creation of an interactive website where it is possible to access all the publications related to the project, to have direct contact with researchers for further information and to visit the "virtual laboratory", the realization of a "dedicated chat line" (and/or programmed teleconferences) for discussion among researchers, the edition of a VELLA electronic newsletter reporting the most important news and the organization of dedicated workshops on

specific issues related to the HLM technology, has the main objective to create a real "virtual" community of researchers in the field of HLM technologies for nuclear applications.

In this framework a workshop on materials for HLM cooled reactors and related technologies, which will be held in Rome, on May 21st-23rd 2007, is under organization.

Networking Activity 3: "Harmonisation of knowledge and establishment of good practices"

The activity is dedicated to the improvement and the harmonization of the scientific knowledge of the present generation of scientists and engineers coming from different areas of the nuclear R&D projects related to HLM, as well as to the preparation of the new generation of scientists, by giving them a common platform of knowledge and developing their skills in all aspects of HLM technologies and related areas. These goal will be pursued through the organization of thematic workshops on HLM and 'Good Practices' workshops for young researchers, especially PhD students and Post-Doctoral fellows, involved in the field of nuclear science coming from Universities/Agencies/Companies in the different research teams or laboratories of the organizations grouped in VELLA.

Networking Activity 4: "Guidelines and procedures"

The activity is aimed at developing guidelines for relevant issues for future HLM systems, by means of collecting the available information on materials, corrosion tests, mechanical properties, calibration of oxygen sensors and measurements of oxygen concentration, analysing the experimental procedures used in different laboratories, evaluating the quality of the available data, identifying the parameters and the conditions not covered by the available information and realizing, if needed, some experiments to cover the existing gaps.

Networking Activity 5: "Collaborations with other programmes and future R&D "

The activities envisaged in the NA5 are the set up of a group of experts, including the major EU specialists in the field of HLM, the establishment of links with other teams working on programmes related to the HLM technologies in order to have a complete overview of the different research actions going on and to promote collaboration and exchange of knowledge and, finally, the evaluation of the possible synergies and the maximisation of the profit of the researches in progress.

The driving idea is to promote a real integration among the EU activities on HLM already going on within Europe in several fields and to establish regular and coherent links among National, European and International programmes in the field of HLM technologies in order to increase the possible technical cooperation.

Transnational Access Activities

The TA objectives are to promote the access of researchers, universities and firms to the existing infrastructures and knowledge, in order to increase the competitiveness of the European industry, to train the researchers in using the EU infrastructures during the three years duration of the project and to help the human mobility between and towards the laboratories. These objective will be realized using two different tools:

1. Access to the infrastructures, granted to the users interested in technological development and/or basic research,
2. Human Mobility, to support researchers inside and outside the VELLA Consortium.

Joint Research Activities

The objectives of the activities are the development and the justification of the technologies needed for the operation of large facilities for future Gen IV reactors and ADS cooled by HLM, the development of the needed components and instrumentation, the study of the liquid metal thermal-hydraulics and the analysis of the effects of irradiation in presence of LBE, homogenizing and completing the results obtained in the other research programmes related to the HLM technologies for nuclear applications.

VELLA

List of contractors:

Participant role	Participant number	Organisation	Short name	Country
CO	1	Ente per le Nuove Tecnologie, l'Energia e l'Ambiente; Dipartimento Fusione, Tecnologie e Presidio Nucleare	ENEA	Italy
CR	2	Le Commissariat à l'Energie Atomique	CEA	France
CR	3	CIEMAT	CIEMAT	Spain
CR	4	Consiglio Nazionale delle Ricerche, Istituto per l'Energetica e le Interfasi (IENI) sezione di Genova	CNR - IENI	Italy
CR	5	CNRS	CNRS	France
CR	6	Forschungszentrum Karlsruhe GmbH	FZK	Germany
CR	7	Forschungszentrum Dresden-Rossendorf e.V.	FZD	Germany
CR	8	Institut Quimic de Sarria (Universitat Ramon Llull)	IQS	Spain
CR	9	Kungliga Tekniska Högskolan	KTH	Sweden
CR	10	Nuclear Research Institute Rez	NRI	Czech Republic
CR	11	Paul Scherrer Institute	PSI	Switzerland
CR	12	The Belgian Nuclear Research Centre	SCK-CEN	Belgium
CR	13	Institute of Physics, University of Latvia	IPUL	Latvia

Coordination:

Gianluca Benamati, ENEA-Brasimone research centre
località Brasiamone
40032 Camugnano (Bologna)
Italy

Budget:

Total Project Cost: 3.318.258,52 €
EC Contribution: 2.300.000,00 €