CARE-ELAN Final Report

ELAN in Summary:

Country	Number of institutes	Number of persons
Finland	1	3
France	8	70
Germany	12	130
Italy	5	45
Netherlands	2	7
Poland	3	20
Portugal	1	3
Spain	3	9
Sweden	1	2
Switzerland	2	3
United Kingdom	15	60
CERN	1	30

Associates: SLAC, Technion, Yerevan, Kracow

Industrial Involvement:

Country	Number of Company
Germany	4
Italy	1
UK	4

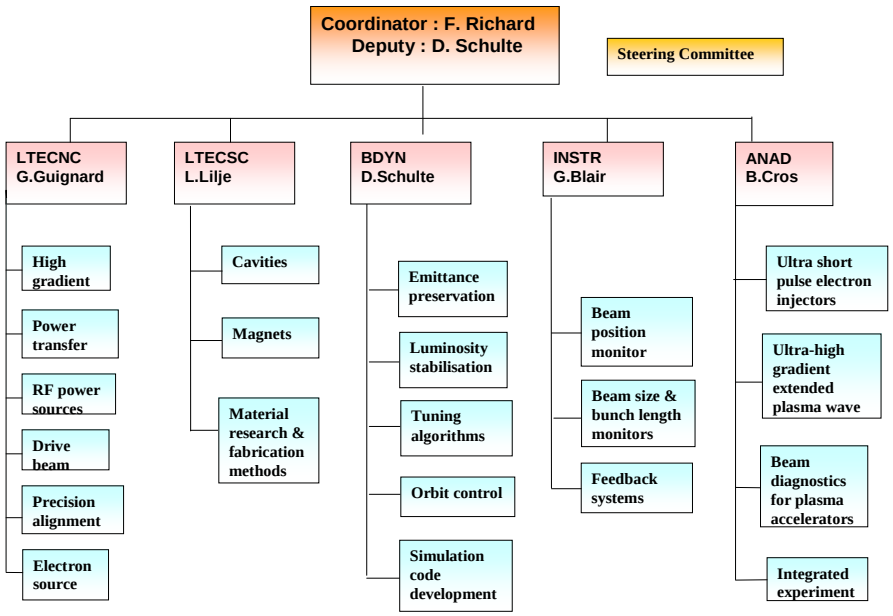
Main Objectives: Coordination of R&D on electron accelerators at the European level. Evaluating the various technologies for improving the present infrastructures and defining a roadmap for future electron accelerators and colliders, including new techniques of acceleration.

Corrected Cost:

Expected Budget	Requested EU Funding
1.6M€	0.68M€

ELAN organisation

ELAN was organised in 5 groups dealing with the various topics related to present and future electron linacs:



Tools

ELAN has the website:
http://esgard.lal.in2p3.fr/Project/Activities/Current/Networking/N2/ELAN/
with:

- Links to the activities and informations of the 5 WG
- List of workshops supported by ELAN
- List of ELAN Documents (these documents are stored under the responsibility of the Coordinator). Some of them, after agreement with the dissemination CARE coordinator, were published as CARE-ELAN Notes.

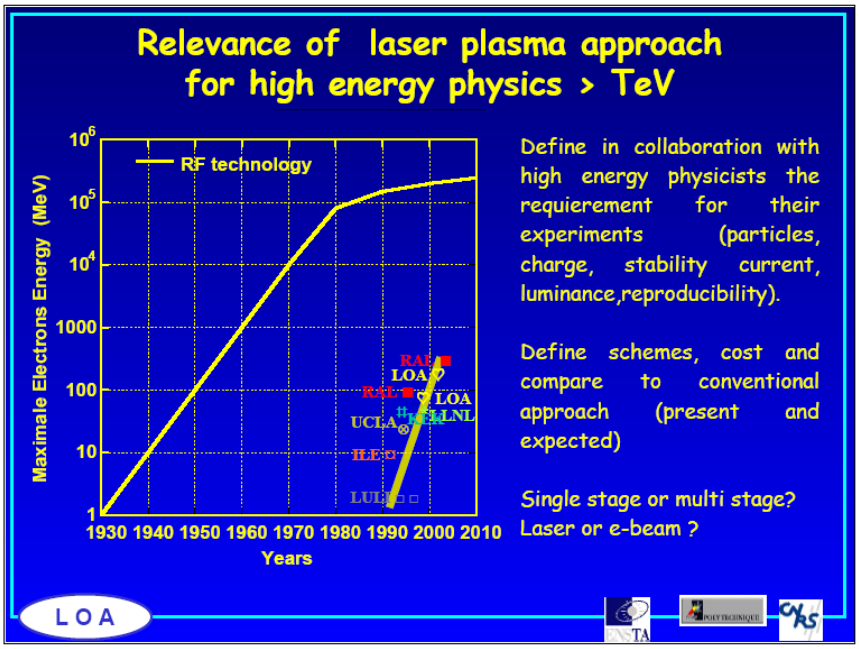
Main topics in ELAN

ELAN activities are connected to the two major efforts towards a worldwide Linear Collider

- ILC a project for a supraconducting Linear Collider LC with 0.5-1 TeV centre of mass energy. A costed project was delivered in 2007. This project is strongly connected to the ongoing construction of an XFEL in DESY.
- CLIC which has developed an R&D for a normal conducting high-gradient LC which aims at 3 TeV with a 1st step at 0.5 TeV

With the rapid development of the collider project organisations and the advent of the design study EUROTEV, ELAN became more and more embedded in these organisations. In

particular, in the ILC organisation, LTECSC and INSTR where progressively integrated within the GDE.
ELAN was also set to design a strategy for more futuristic projects, in particular for plasma acceleration. This technique allows to reach up to GeV/cm accelerating gradients given by an excited plasma. This plasma is either excited by an auxiliary electron beam or by a very powerful laser. Both techniques have been tried with remarkable results recently achieved. The role of ELAN has been to help in connecting the accelerator community to this effort and to develop a NEST initiative called EUROLEAP which was approved in 2006. The following slide summarized the strategy of this activity.



What was achieved during ELAN

As will become clear in the following examples the role of ELAN has been to improve **communication** between the various actors working on R&D for colliders. This was naturally fostered by the ELAN management present in the activities around CLIC and ILC and for laser plasma projects. This communication was, in particular, insured by supporting some key workshops. What was achieved:

- Improved communication on R&D efforts was e.g. achieved on positron sources where different options were discussed both for CLIC and ILC (see for instance http://home.hiroshima-u.ac.jp/posipol/)
- Improved communication between CLIC and ILC experts on items common to both projects (site studies, costing, damping rings, emittance preservation, beam delivery systems, detectors). This resulted very recently in an MoU between ILC and CLIC involving 7 working groups (Chicago meeting http://www.linearcollider.org/lcws08/)
- Improved communication with the laser-plasma community which has resulted in the **International Workshp on High Energy Electron Acceleration Using Plasmas 2005** (http://polywww.in2p3.fr/actualites/congres/heeaup2005/)

- ELAN conveners were actively involved in the preparation of FP7 contracts, specifically EUCARD, the successor of CARE and ILC-Higrade which supports the European Preparatory Phase for ILC (which is acknowledged as one of the ~30 projects of the European Roadmap defined within the forum ESFRI).Through our connection to ESGARD it was possible to adjust to the reactions of our community to the severe limitation of the resources. We also encouraged a continued connection to the laser-plasma effort. Finally we actively participated to a common meeting at CERN with a large community to insure, again, good communication between the partners.

ELAN CONNEXIONS

ELAN WP	LINAC Test Beams TTF CTF	CARE JRA SRF PHIN	WW Collider ILC CLIC	Laser/Plasma Facilities ALPHA-X LOA….
NC	X	X	X	X
SC	X	X	X	
BDYN	X	X	X	X
INSTR	X	X	X	X
ANAD		X		X

Above table summarizes the various ELAN connections

This good communication between CLIC and ILC allows to prepare for a major step: decision on a future worldwide LC. As pointed out by the new CERN DG the final decision will be taken given the LHC results but we need to prepare, on comparable grounds (cost, schedule etc…), tangible elements for this decision

Subjects with strong synergy
Working Groups & Conveners

	CLIC	ILC
Physics & Detectors	L.Linssen, D.Schlatter	F.Richard, S.Yamada
Beam Delivery System (BDS) & Machine Detector Interface (MDI)	D.Schulte, R.Tomas Garcia E.Tsesmelis	B.Parker, A.Seriy
Civil Engineering & Conventional Facilities	C.Hauviller, J.Osborne.	J.Osborne, V.Kuchler
Positron Generation (new)	L.Rinolfi	J.Clarke
Damping Rings (new)	Y.Papaphilipou	M.Palmer
Beam Dynamics	D.Schulte	A.Latina, K.Kubo, N.Walker
Cost & Schedule	H.Braun, K.Foraz	J.Carwardine, P.Garbincius, T.Shidara

Above Table summarizes the CLIC-ILC agreements.

In terms of CARE-ELAN deliverables

ELAN web site	Web site	All WPs	CNRS-Orsay
Beam Dynamics code repository site functional	Data base	WP3	CERN
Instrumentation web site	Web site	WP4	STFC, UMA
Instrumentation data base	Data base	WP4	STFC, UMA
Work plan and documentation data base	Data base	WP1	CERN
Data base on SRF documents	Data base	WP2	DESY
Data base on diagnostics performance	Data base	WP4	STFC, UMA
Data base on laser plasma acceleration	Data base	WP5	CRNS-LPGP
Final report of the ELAN network	Report	All WPs	CNRS-Orsay

These goals were fulfilled with the exception of the Data.base on laser plasma acceleration which could not be achieved by the ANAD convener heavily committed on the EUROLEAP (NEST) effort.

In terms of support to Workshops and internal publications:
(see http://esgard.lal.in2p3.fr/Project/Activities/Current/Networking/N2/ELAN/)

Year	2004	2005	2006	2007	2008
Documents	27	20	17	26	12
Workshops	2	16	12	11	10

ELAN has supported the International Accelerator School for Linear Colliders (70 students in 2008 see http://www.linearcollider.org/cms/?pid=1000490) which has allowed some financial support for some professors.

Highlights of ELAN

They are summarized in the following table:

Selected Achievements	**Impacted Projects**	**Main improvement**	**Future impact**
R&D on Positrons	ILC CLIC	Comparison of the 3 techniques proposed	Optimal choice
ILC-CLIC Collaboration	ILC CLIC	Combined effort into 7 common working groups	Final decision on an LC after LHC results
Connection to plasma acceleration	EUROLEAP	Connection of the accelerator community to plasma techniques	Beyond present collider projects