



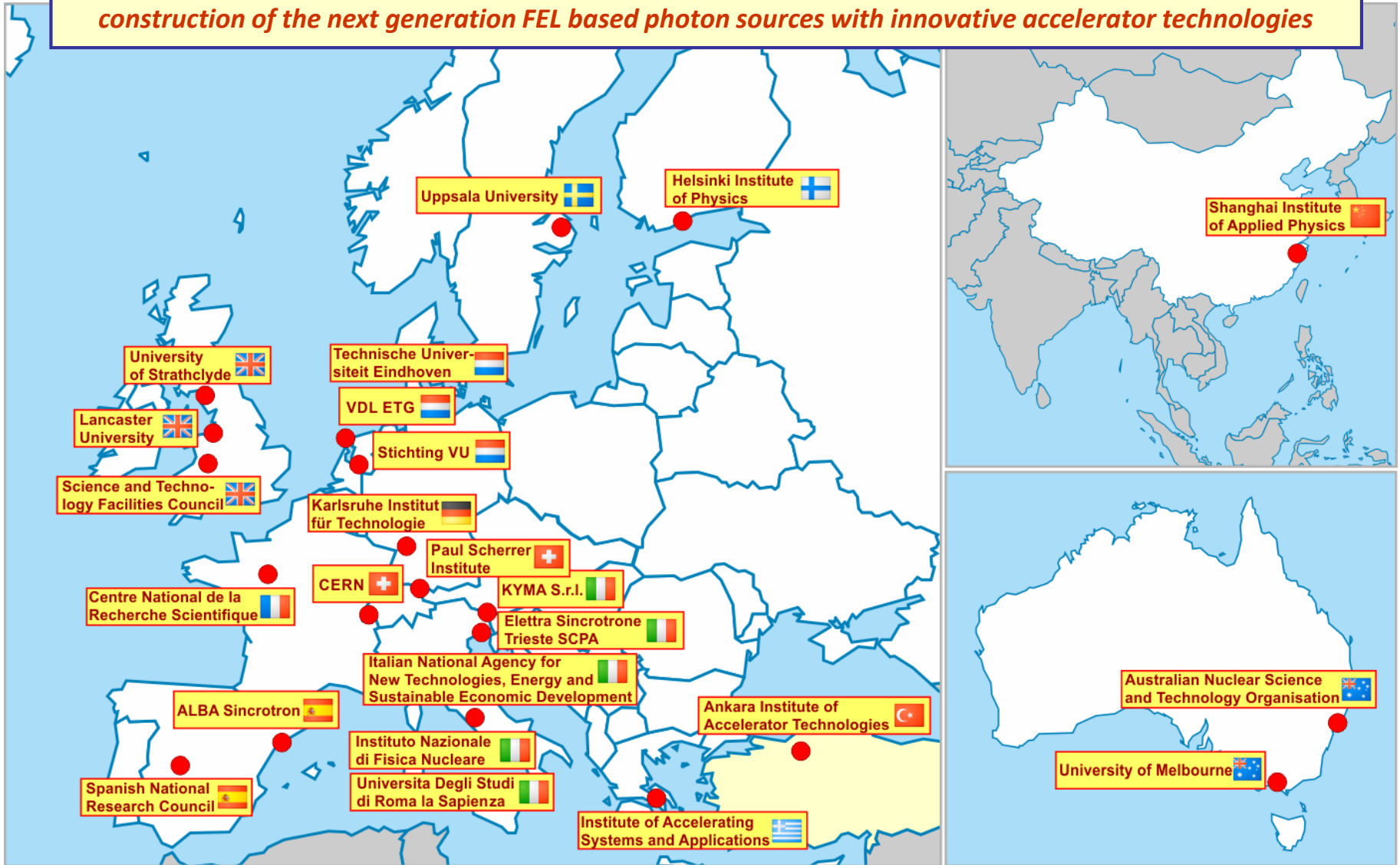
Funded by the European Union

The CompactLight Project (XLS)

*Gerardo D'Auria
on behalf of the CompactLight Collaboration*

CERN January 25th 2018

The XLS Collaboration is an initiative among several International Laboratories aimed at promoting the construction of the next generation FEL based photon sources with innovative accelerator technologies



FEL Facilities	Institutes
Hard X-ray	STFC, PSI, UA-IAT, SINAP, UoM, ANSTO.
Soft X-ray	ELETTRA-ST, INFN.
Compton Sources	TU/e, ANSTO.
Upgrading of existing Facilities	ELETTRA-ST, INFN.

CERN has no direct interest in Synchrotron Light Sources and FELs, but the activities on CompactLight will have strong return value for the CLIC project: i.e. accelerator and RF components optimization, technical developments with industry, costs reduction, etc.

Sub-systems	Institutes
Accelerating Structures	CERN, SINAP, UU, VDL-ETG, PSI, CSIC, UH/HIP, USTR.
Undulators	ENEA, STFC, KIT, PSI, KYMA, ALBA-CELLS, UU, VU.
Beam diagnostics and manipulation	ST, CERN, STFC, SINAP, IASA, UU, UA-IAT, ULANC, INFN, SAPIENZA, INFN, PSI, ALBA-CELLS, CNRS

Compact

<http://compactlight.web.cern.ch>

(work in progress)

*is a Project submitted in March 2017, for EU funding to
Horizon2020 - Work Programme 2016 – 2017
Research & Innovation Action (RIA)
INFRADEV-1-2017 Design Studies*

Participant		Organisation Name	Country
1	ST (Coord.)	Elettra – Sincrotrone Trieste S.C.p.A.	Italy
2	CERN	CERN - European Organization for Nuclear Research	International
3	STFC	Science and Technology Facilities Council – Daresbury Laboratory	United Kingdom
4	SINAP	Shanghai Inst. of Applied Physics, Chinese Academy of Sciences	China
5	IASA	Institute of Accelerating Systems and Applications	Greece
6	UU	Uppsala Universitet	Sweden
7	UoM	The University of Melbourne	Australia
8	ANSTO	Australian Nuclear Science and Tecnology Organisation	Australia
9	UA-IAT	Ankara University Institute of Accelerator Technologies	Turkey
10	ULANC	Lancaster University	United Kingdom
11	VDL ETG	VDL Enabling Technology Group Eindhoven BV	Netherlands
12	TU/e	Technische Universiteit Eindhoven	Netherlands
13	INFN	Istituto Nazionale di Fisica Nucleare	Italy
14	Kyma	Kyma S.r.l.	Italy
15	SAPIENZA	University of Rome "La Sapienza"	Italy
16	ENEA	Agenzia Naz. per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile	Italy
17	ALBA-CELLS	Consorcio para la Construcccion Equipamiento y Explotacion del Lab. de Luz Sincrotron	Spain
18	CNRS	Centre National de la Recherche Scientifique CNRS	France
19	KIT	Karlsruher Instritut für Technologie	Germany
20	PSI	Paul Scherrer Institut PSI	Switzerland
21	CSIC	Agencia Estatal Consejo Superior de Investigaciones Científicas	Spain
22	UH/HIP	University of Helsinki - Helsinki Institute of Physics	Finland
23	VU	VU University Amsterdam	Netherlands
24	USTR	University of Strathclyde	United Kingdom
Third Parties		Organisation Name	Country
AP1	OSLO	Universitetet i Oslo - University of Oslo	Norway
AP2	ARCNL	Advanced Research Center for Nanolithography	Netherlands
AP3	NTUA	National Technical University of Athens	Greece
AP4	AUEB	Athens University Economics & Business	Greece

Italy	5
Neth.	3+1
UK	2
Spain	2
Australia	2
China	1
Greece	1+2
Sweden	1
Turkey	1
France	1
Germany	1
Switz.	1
Finland	1
Norway	0+1
Internat.	1

Our aim is to facilitate the widespread development of X-ray FEL facilities across Europe and beyond, by making them more affordable to construct and operate through an optimum combination of emerging and innovative accelerator technologies.



We plan to design a Hard X-ray Facility using the very latest concepts for:

- a. High brightness electron photoinjectors.*
- b. Very high gradient accelerating structures.*
- c. Novel short period undulators.*

The resulting Facility will benefit from:

- i. A **lower electron beam energy** than current facilities, due to the enhanced undulator performance.*
- ii. Will be **significantly more compact** due to lower energy and high gradient structures.*
- iii. Will have a **much lower electrical power demand** than current facilities.*
- iv. Will have **much lower construction and running costs**.*



Making X-ray FELs affordable

Europa / Participant Portal notification

23-08-2017

Dear Coordinator,

Congratulations. Your proposal has reached the stage of Grant Agreement preparation. To view the evaluation results and the instructions on how to provide additional information and data required for the preparation of your Grant Agreement, log on to the Participant Portal > My Area > My Project(s) (<https://ec.europa.eu/research/participants/portal/desktop/en/projects/index.html>) and click the Manage Project (MP) button. You will receive a separate notification when additional information for the Grant Agreement is required.

Regards,
Participant Portal Grant Management Service

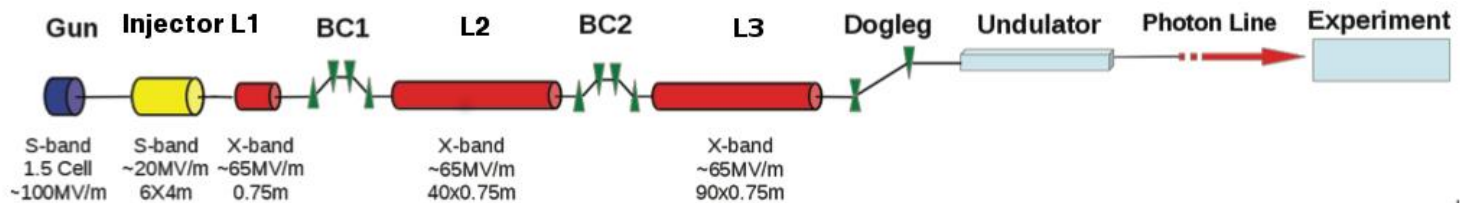
1. **Proposal:** 777431 — XLS
2. **Starting date:** 01-01-2018
3. **Duration of the action:** 36 months
4. **Maximum grant amount:**
 - a. Total cost of the project: >3.5 M€
 - b. Requested EU contribution (according to proposal): 2,999,500 €
 - c. Maximum grant amount (proposed amount, after evaluation): 2,999,500 €

**100%
FUNDED!**

EU Project Officer: Mina KOLEVA

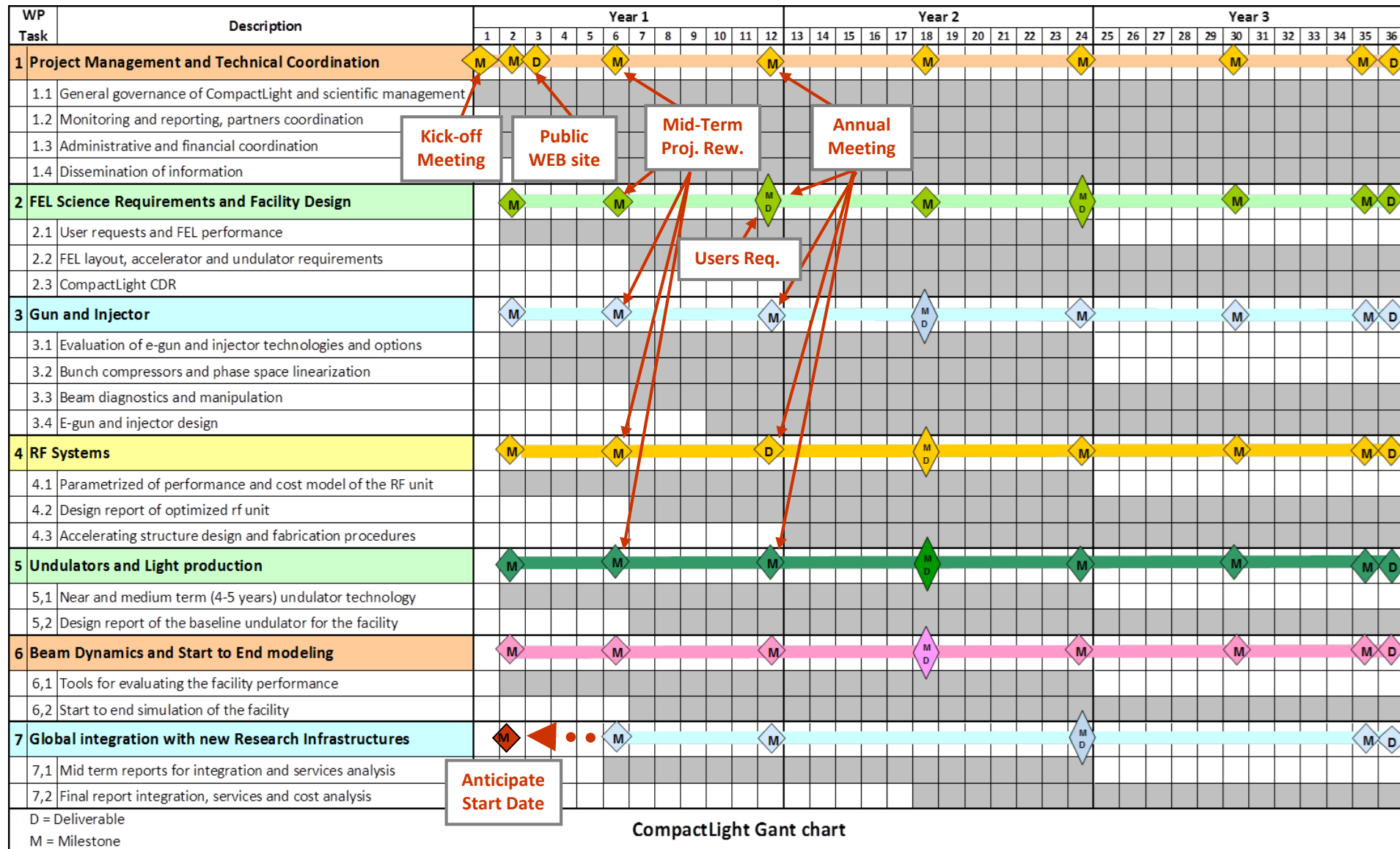
EU Legal Officer: Spyridon POLITOPOULOS

Parameter	Value	Unit
Minimum Wavelength	0.1	nm
Photons per pulse	$>10^{12}$	
Pulse bandwidth	$\ll 0.1$	%
Repetition rate	100 to 1000	Hz
Pulse duration	<1 to 50	fs
Undulator Period	10	mm
K value	1.13	
Electron Energy	4.6	GeV
Bunch Charge	<250	pC
Normalised Emittance	<0.5	mrاد



Preliminary Parameters and Layout of XLS hard X-ray FEL facility

Work Package		Lead Participant	Person Months	Start Month	End month
WP1	Project management and Technical Coordination	Elettra - ST	32	1	36
WP2	FEL Science Requirements and Facility Design	STFC	68	2	36
WP3	Gun and Injector	INFN	76	2	36
WP4	RF systems	CERN	78	2	36
WP5	Undulators and Light production	ENEA	81	2	36
WP6	Beam dynamics and Start to End Modelling	UA-IAT	78	2	36
WP7	Global Integration with New Research Infrastructures	ST	27	6 (2)	36
Total Person Months			440		



CompactLight Gant chart

Anticipate Start Date

Kick-off Meeting

Public WEB site

Mid-Term Proj. Rew.

Annual Meeting

Users Req.