



**LEAPS** League of European  
Accelerator-based  
Photon Sources

# LEAPS: getting our act together

*Andrew Harrison*  
*Diamond Light Source, UK*

**LENS Launch Event**  
**Liblice, 26<sup>th</sup> March 2019**

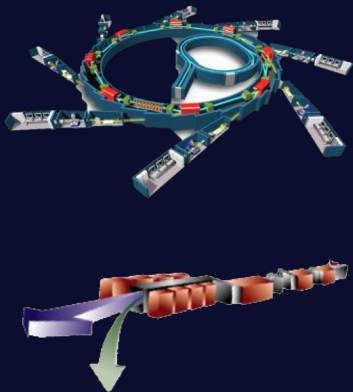






# 13 European Synchrotron

Radiation and 6 FEL Facilities are joining forces to master the challenges of the next decades

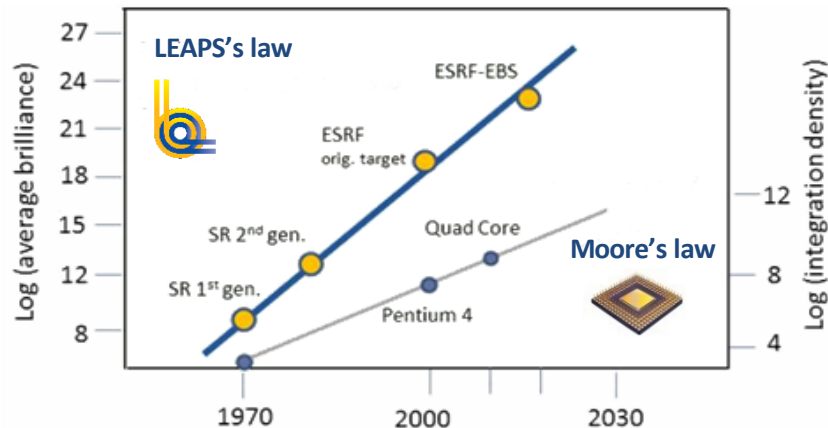




# LEAPS Members and Aims

**16 Members: all SR and FELs operating in EU agree to work coherently to:**

- Shape future science & technology at accelerator-based light sources
  - **Collective landscape document and strategy** across European facilities
  - Periodical update of **roadmaps and action plans for key technologies**
  - **Develop future policies with stakeholders** (e.g. European Commission)
- Engage more effectively with industry and **boost innovation**
- Improve and broaden user access and **enhance European integration**
- Promote **Open Science, education, training and exchange of staff, common indicators, communication and outreach**





# A Brief History of LEAPS

Frankfurt  
November

Brainstorming  
and Analysis  
of challenges  
After DESY  
call

ESRF

Initiative  
analysis and  
WG reports

SOLARIS

WG  
reports.

Brussels

Launch event  
and  
Coordination  
Board  
constitution

DESY

1<sup>st</sup>  
Plenary  
meeting

05/15

01/16

06/16

11/16

02/17

06/17

11/17

03/18

11/18

4/19

DESY

LEAPS  
agenda and  
WGs

Diamond

LEAPS  
declaration,  
ESUO  
analysis

SOLEIL

Strategy  
discussion  
and WG  
reports

ELETTRA

Finalizing  
strategy,  
WGs reports

Brussels

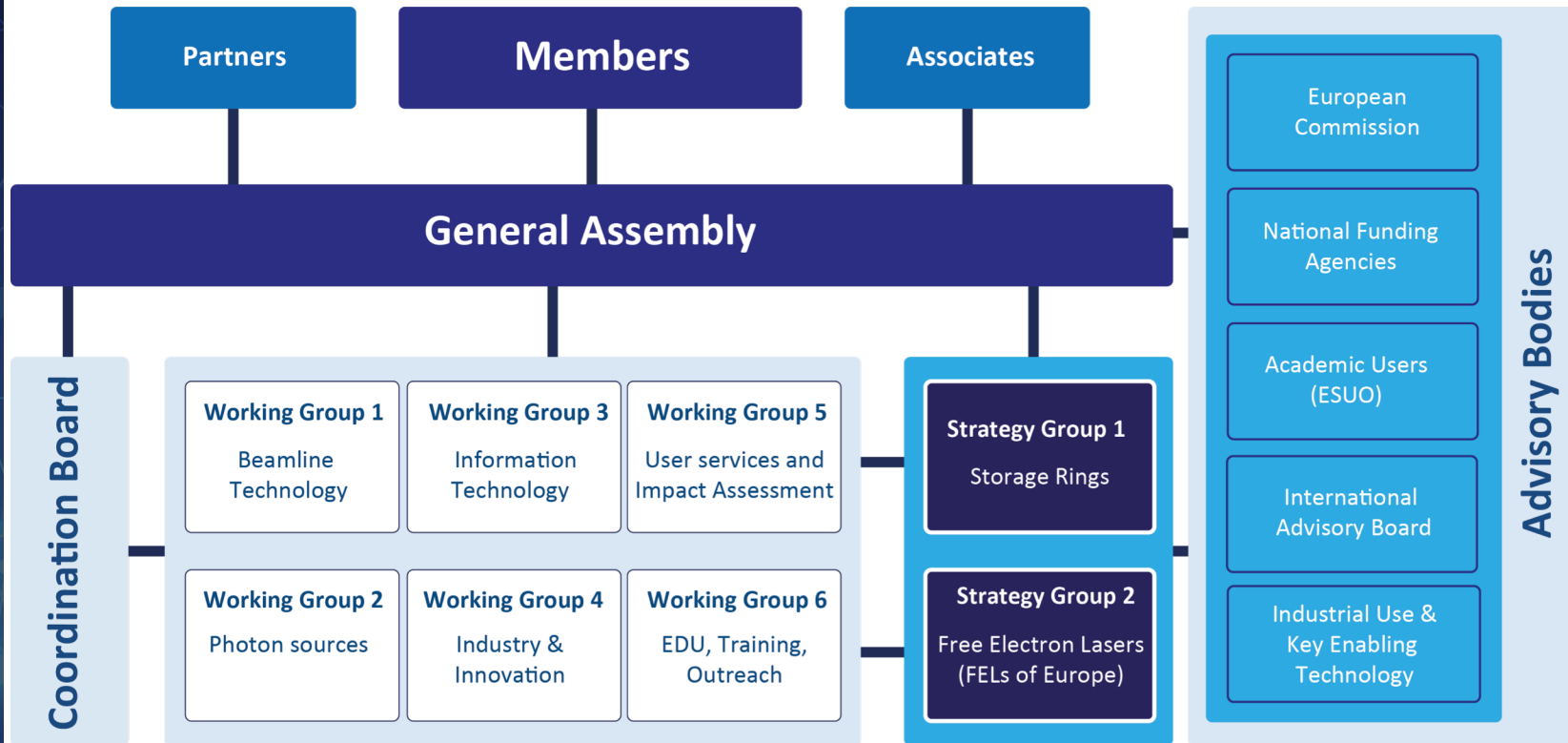
General  
Assembly





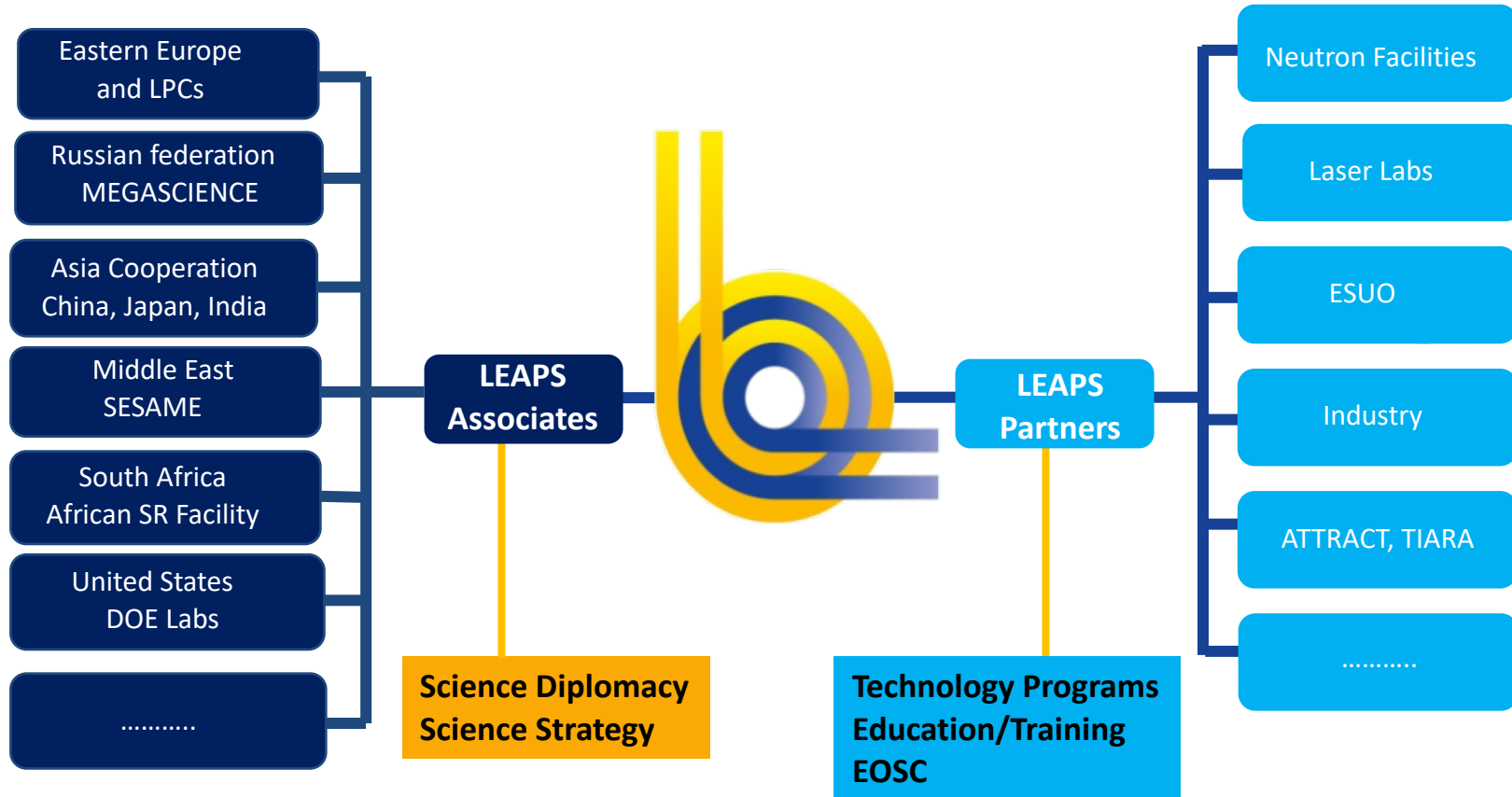
# Organisation

Operational since Nov 2017





# Strategic partnerships in EU and beyond







# LEAPS Strategy 2030

- Published 03/2018
- Addresses the key issues of the European Long-Term Sustainability action plan for RIs



[http://www.esfri.eu/sites/default/files/u4/ESFRI\\_SCRIPTA\\_SINGLE\\_PAGE\\_19102017.pdf](http://www.esfri.eu/sites/default/files/u4/ESFRI_SCRIPTA_SINGLE_PAGE_19102017.pdf)

[https://ec.europa.eu/info/publications/sustainable-european-research-infrastructures\\_en](https://ec.europa.eu/info/publications/sustainable-european-research-infrastructures_en)

## LEAPS STRATEGY 2030

Proposal for a new research and innovation consortium in FP9 and beyond



## Appendix LEAPS STRATEGY 2030

Strengthening Europe's leading role in science and innovation





# LEAPS Strategy 2030

- Published 03/2018
- Addresses the key issues of the European Long-Term Sustainability action plan for LEAPS RIs
  - **Excellent science** through excellent services
  - Ensure the right **people** are in the right place at the right time
  - Optimal use of their **data**
  - Exploiting their potential as **innovation** hubs
  - Demonstrating **socio-economic impact**
  - Effective **governance** and **sustainable long-term funding**



## LEAPS STRATEGY 2030

Proposal for a new  
research and innovation  
consortium in FP9 and  
beyond



## Appendix LEAPS STRATEGY 2030

Strengthening  
Europe's leading  
role in science  
and innovation





# Working together – 100s in 6 Working Groups

## Technological

### WG1 – Beamline technology

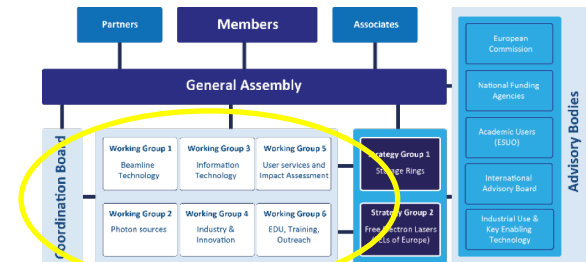
- Detectors
- Optics and BL Instrumentation
- Sample Environment

### WG2 – Photon Sources

- Compact Sources
- FEL Developments
- Storage Rings

### WG3 – DATA management and software

*More efficient and more cost-effective technology development with smart specialisation of European expertise and benefitting European industry*



## Networking & services to users and society

### WG4 – Industry & innovation

### WG5 – User Services & Impact

### WG6 – Education, Training & Outreach

# LEAPS first Plenary Meeting

12-13 November DESY, Hamburg



SESAME welcomed as  
1<sup>st</sup> LEAPS Associate

13 pilot research projects have been presented

Open session with European Commission and national funding agencies to discuss different possibilities for funding common research projects



# Prioritization for the 13 Pilot Projects

Preparation for HZ2020  
INFRAINNOV-4-2020  
Innovation pilots

PP partly in call

In kind contribution will cover  
the missing funds

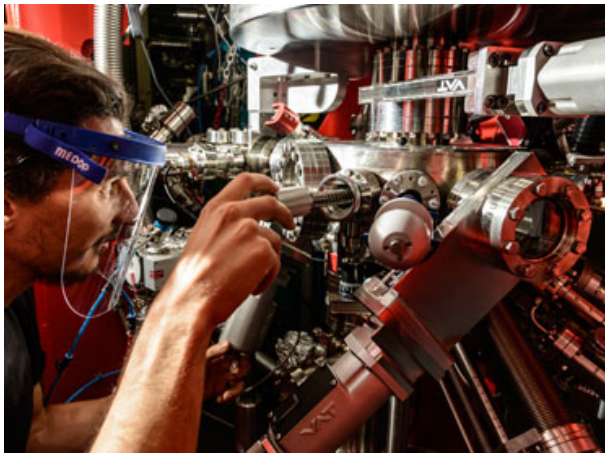
Worksheet for prioritizing

WG number	The title/subject of the pilot project	Proposed Budget	Cat A: approved for EC project proposal with budget of [Mio€]	Cat B: approved as LEAPS internal	not approved yet [Mio€]	Comments
1 (Detectors)	New generation of XAFS detectors	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	Verification necessary for integration
1 (Detectors)	Tool Box	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
1 (Optics)	SUPERFLAT	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
1 (Optics)	NeXtgrating	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	Wait for funding
1 (Exp. Envir.)	New positioning and scanning	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
2	LIDs - Insertion Devices	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
3	IT Strategic Blueprint	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
3	Data reduction and compression	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
4	IILS - Industrial Innovation thr. light sources	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
4	SILS - SME innovation thr. light sources	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
5	Wayforlight	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
5	Impacts assessment	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
6	Scientific focal points for new users...	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
	Total	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

# WG1 Beamline Technology

## Sub WG's

- Detectors (2)
- Optics and instrumentation (2)
- Sample environment (1)



## Five Pilot Projects presented:

- High Throughput X-ray Spectroscopy Detector System
- Detector Toolbox
- Superflat -industrial production of flat X-ray mirror and grating substrates
- NeXtgrating – Next generation diffraction gratings
- Positioning and scanning systems for speed and accuracy



# WG 2 Photon Sources (accelerator technology)



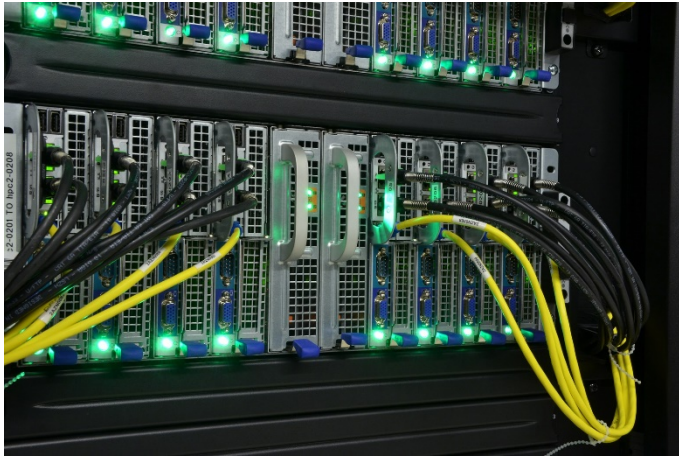
## 1 Pilot Project:

### LEAPS R&D Topic Insertion Devices (LIDs):

R&D on novel undulator technology pushing the parameters for

- high field / short period
- advanced schemes for EPU (elliptically polarizing undulator)
- optimize production cost

# WG 3 Information Technology



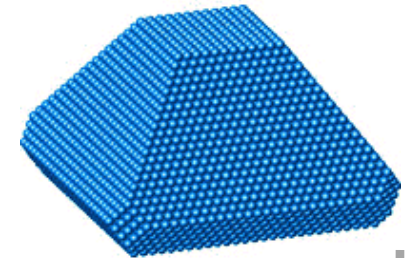
Facing explosion of data volumes with new detector technologies

Open data policies, FAIR data  
Connection to EOSC

Aiming at user services and  
infrastructure optimisation

## 2 Pilot projects:

- Data reduction and compression
- IT strategic blueprint



A. Stierle, DESY  
P. Vashishta, USC



# WG4 Industry as provider and as user

## 2 Pilot Projects

- Industrial Innovation through Light Sources (IILS)
- SME Innovation through Light Sources Services



# WG 5 User service & impact

## 2 Pilot Projects

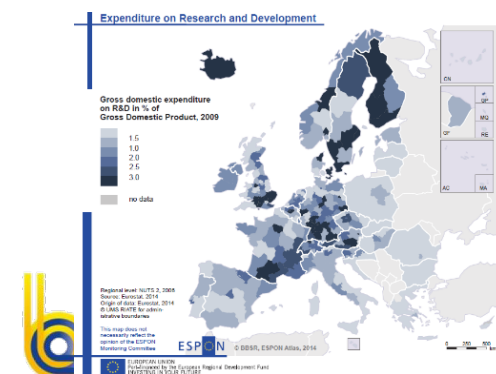
- Wayforlight as a new e-infrastructure serving the user community
- Impact assessment and standardized metrics for LEAPS



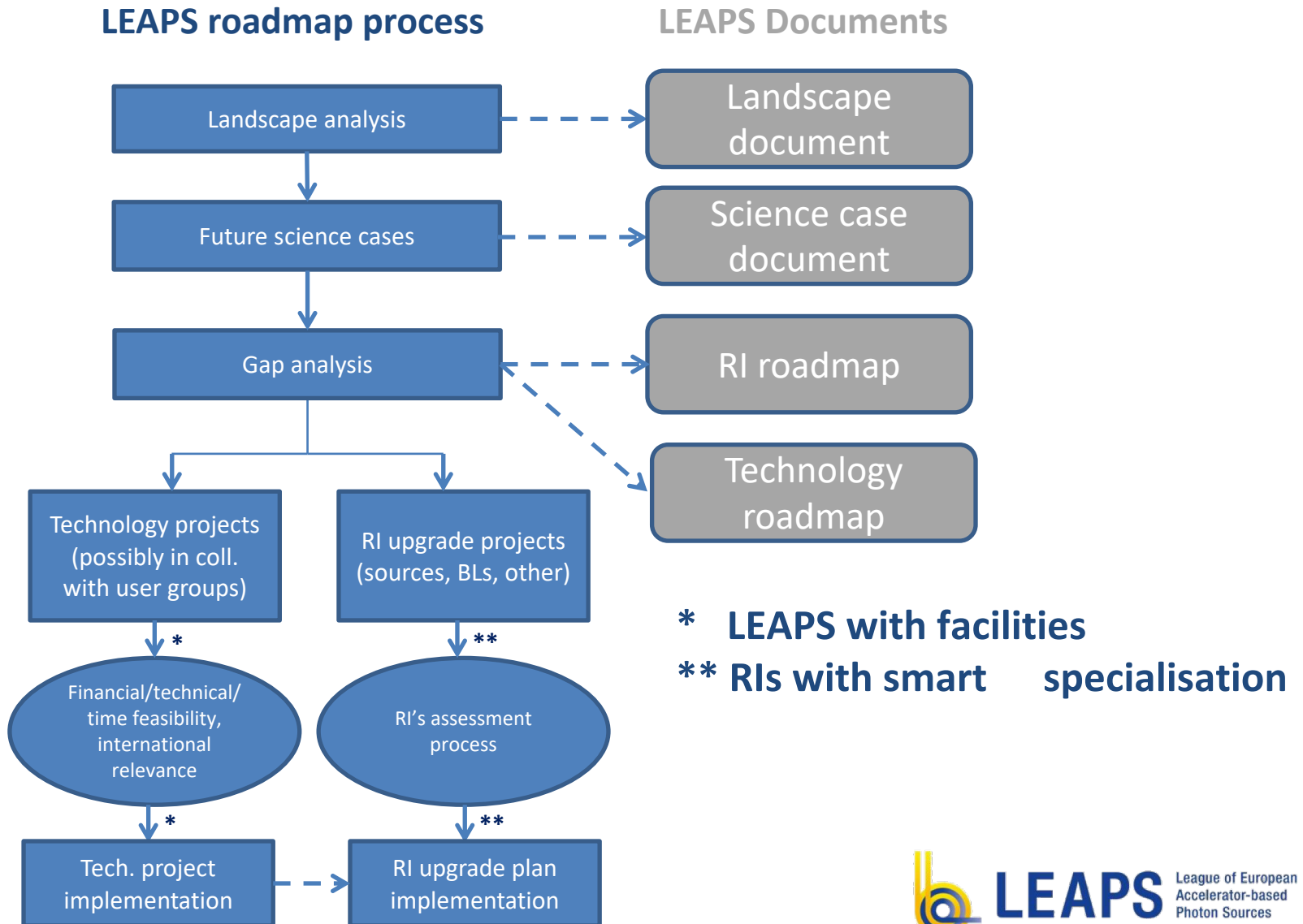
# WG 6 Education, training & outreach

## 1 Pilot Project

- Scientific focal points for new countries, new communities, new users, SMEs and industry



# Landscapes and roadmaps



# European Landscape 2020+

## A new vision for European cooperation

LEAPS will be the world's most advanced science consortium

- Boosting **science and innovation** in Europe
  - Devising **robust roadmaps** for the further development of European Ris
  - **Share expertise and resources** for technology developments (incl. EOSC)
  - Speaking with **one voice** to European and national decision makers
  - Enable **new ways of cooperation** with industry
  - Offering a new **platform for the education** of the next generations of scientists and engineers
- **providing the maximum return on the substantial investments made**



**Thank you for your attention**

**A future  
European Landscape**





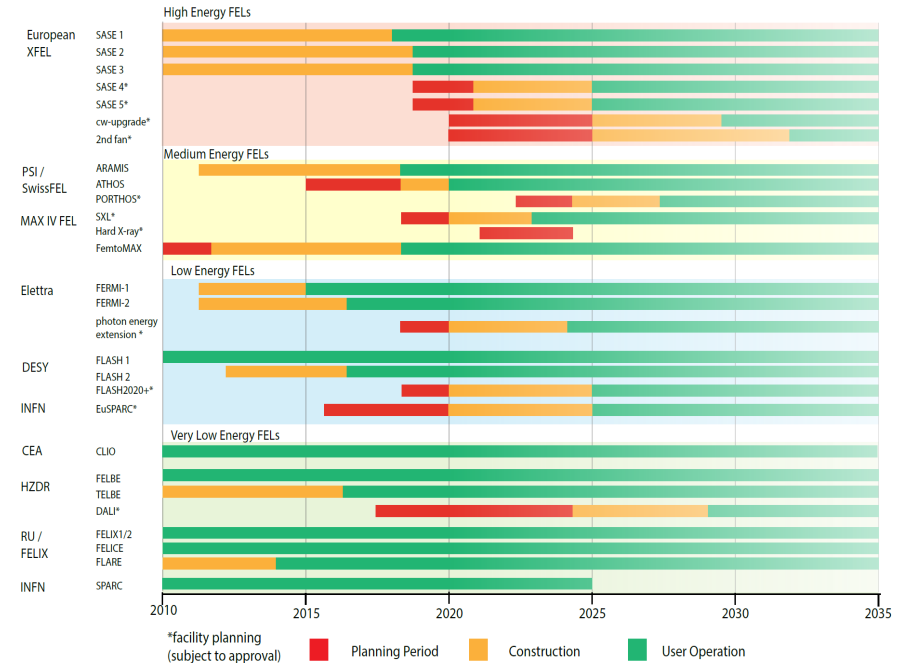


# Landscapes and roadmaps

## Storage Rings



## Free Electron Lasers



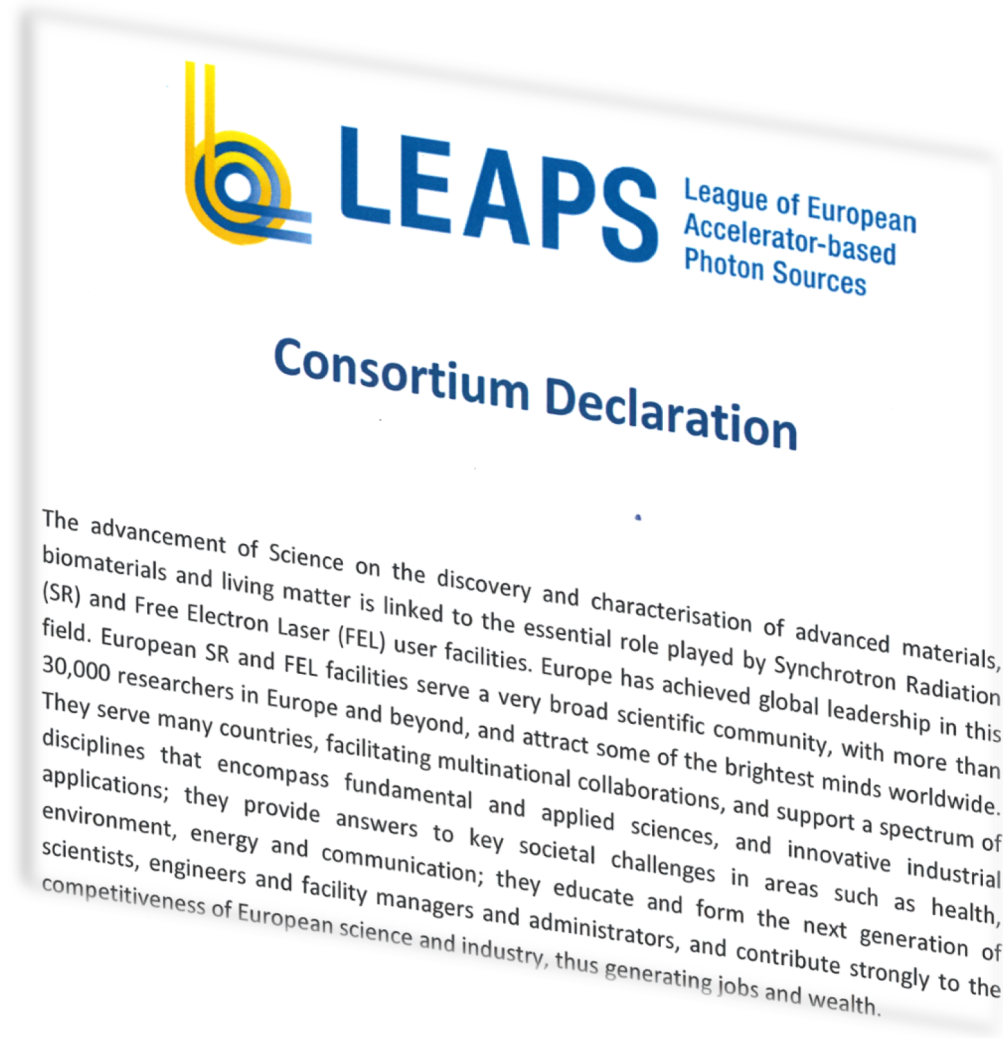
Timeline of the existing storage ring and FEL facilities, approved upgrades and plans for upgrades not yet approved (\*)



# 1<sup>st</sup> official document

Signed by 16  
member facilities  
on the 13-11-17  
at the Brussels  
Launch Event

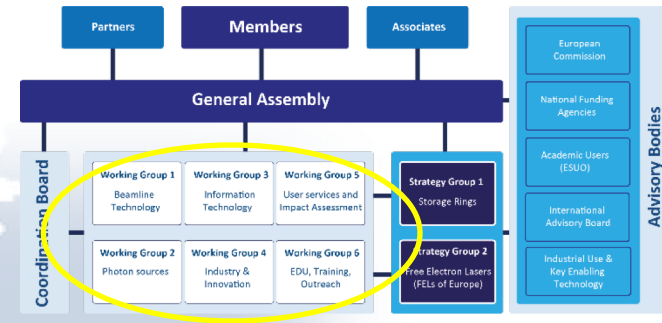
First GA Meeting





# LEAPS

League of European  
Accelerator-based  
Photon Sources



Advanced Technologies for Europe

## LEAPS Working Groups

> 100 experts from all member states working together

- devising technology roadmaps for advanced and disruptive technologies
- new era of European cooperation
- more efficient and more cost-effective technology development
- smart specialisation of European expertise
- benefit for European industry

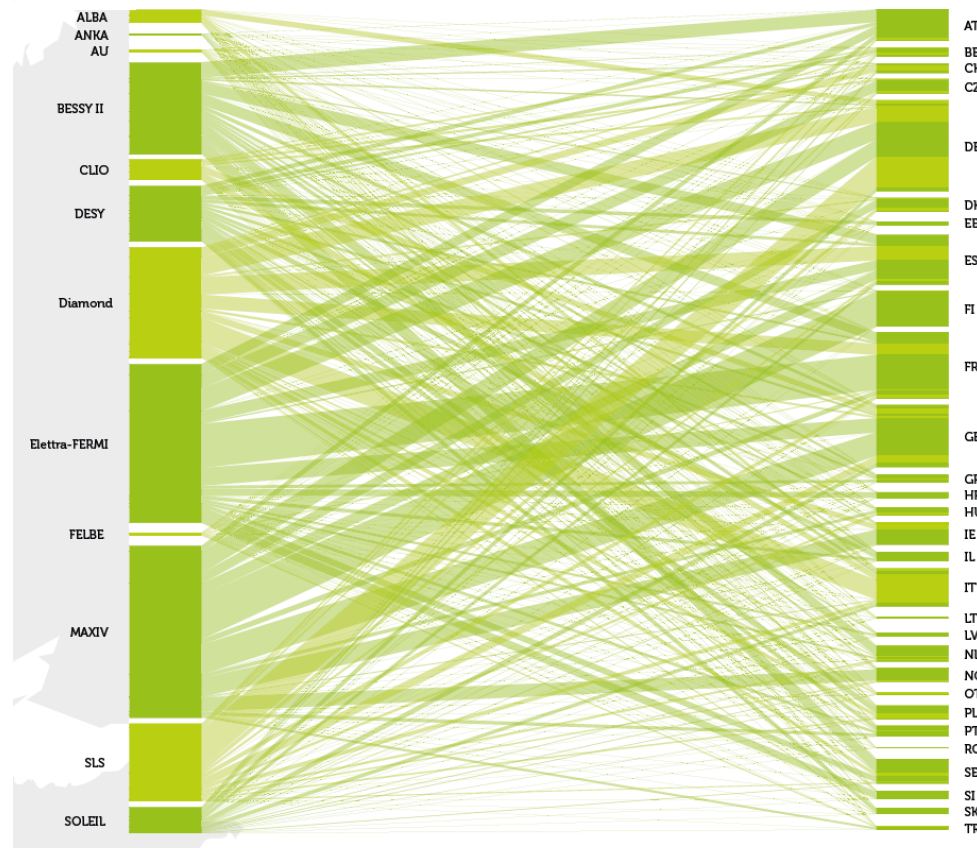
Current projects: first glimpse of what will be possible in the coming years

**Big first success of LEAPS !**

# 25000 users in Europe

Visiting all facilities, sharing instruments, solving problems together, creating collaborations, proposing technologies, asking for more brilliant beams...

=> Preparing the road to LEAPS



Synchrotron/FEL community is fully transnational.

Facilities, through LEAPS, are taking over from users and further developing the already fruitful collaboration

From ESUO, 2016

The diagram shows the national interweaving of research at European light sources. The left side displays selected light sources and their respective beamline hours used for transnational access. These hours are correlated to the group leaders' home institution countries (right side).



# Vision and Goals

## Longterm Vision

- to establish itself in Europe as a **new force** shaping the future strategy in Photon Science.
- to have a lasting impact on the Europe **research agenda**.
- to contribute a critical **added value** for all its members.
- to lobby for Photon Science and develop **proposals** in EU FPs and beyond.

## Midterm Vision

- to establish a **co-fund action HZ Europe**
- to develop an action and business plan/organisation ("LEAPS Project Agency").
- to implement the complex **national upgrade projects** of LEAPS facilities in a coordinated plan.
- to enable the development and implementation of **new technologies** in a concerted effort far superior to fragmented national efforts leading to better and more cost-efficient technologies.

## Shortterm Plan

- to prepare for H2020 INFRAINNNOV-4-2020, innovation pilots
- The application will consist of two parts:
- Part a) Preparation of the details of the LEAPS Project Agency
  - Part b) Launch of first key technology projects within LEAPS.
- to pursue and coordinate other on-going collaborations

One of the main LEAPS drivers:

How to optimize next generation facilities

What will be the future of photon science

What are the challenges of high brilliance  
synchrotrons and their beamlines

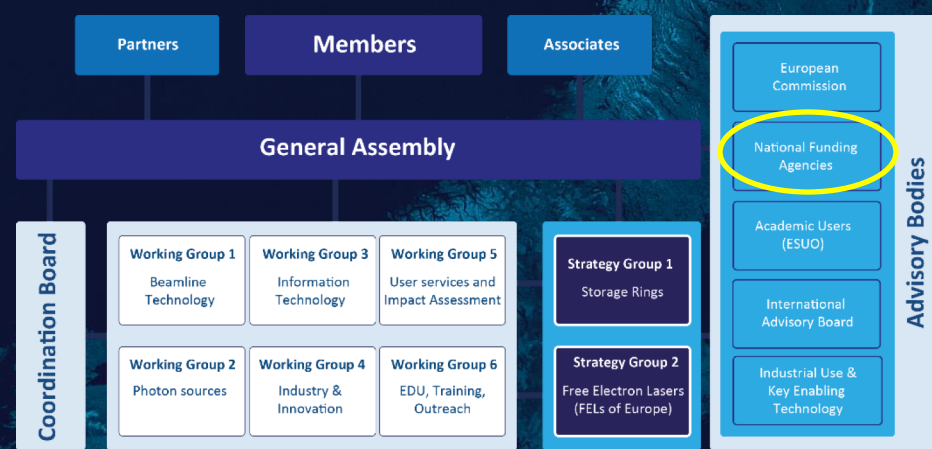
What are the challenges of multiuser FELs



# Countries

- Denmark
- France
- Germany
- Italy
- Netherlands
- Poland
- Spain
- Sweden
- Switzerland
- UK

+ those participating to ESRF and EU XFEL



NFA will participate in LEAPS projects as cofunding agencies  
1<sup>st</sup> information meeting of National Funding Agencies at the 1<sup>st</sup> LEAPS plenary meeting on 12 November  
Participation to a round table, stating their interest in supporting the initiative through their facilities



# LEAPS international presence

