LEAPS League of European Accelerator-based Photon Sources

LEAPS Programme

LEAPS Chairs

LEAPS Plenary meeting 2

PSI, 18-20 November 2019

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LEAPS short history

LEAPS plans for 2020

LEAPS plans for 2020+

LEAPS League of European Accelerator-based Photon Sources

LEAPS

League of European Accelerator-based Photon Sources

Schematic history

Brainstorming
After DESY call

Launch event
Coordination
Board constitution

1st Plenary meeting

1st LEAPS Conference

In progress

LEAPS Co-creation

LEAPS Partnership

05/15 — **2016** — **2017** — **2018** — **2019** — **2020** — **2021** — **...** — **2023 on**

LEAPS declaration,
ESUO analysis
WG definition

Strategy discussion
WG organization

Strategy presentation
Governance definition

Preparation for Horizon Europe
Involving NFA

LEAPS-INNOV
Proposal to H2020 call

Horizon Europe

LEAPS

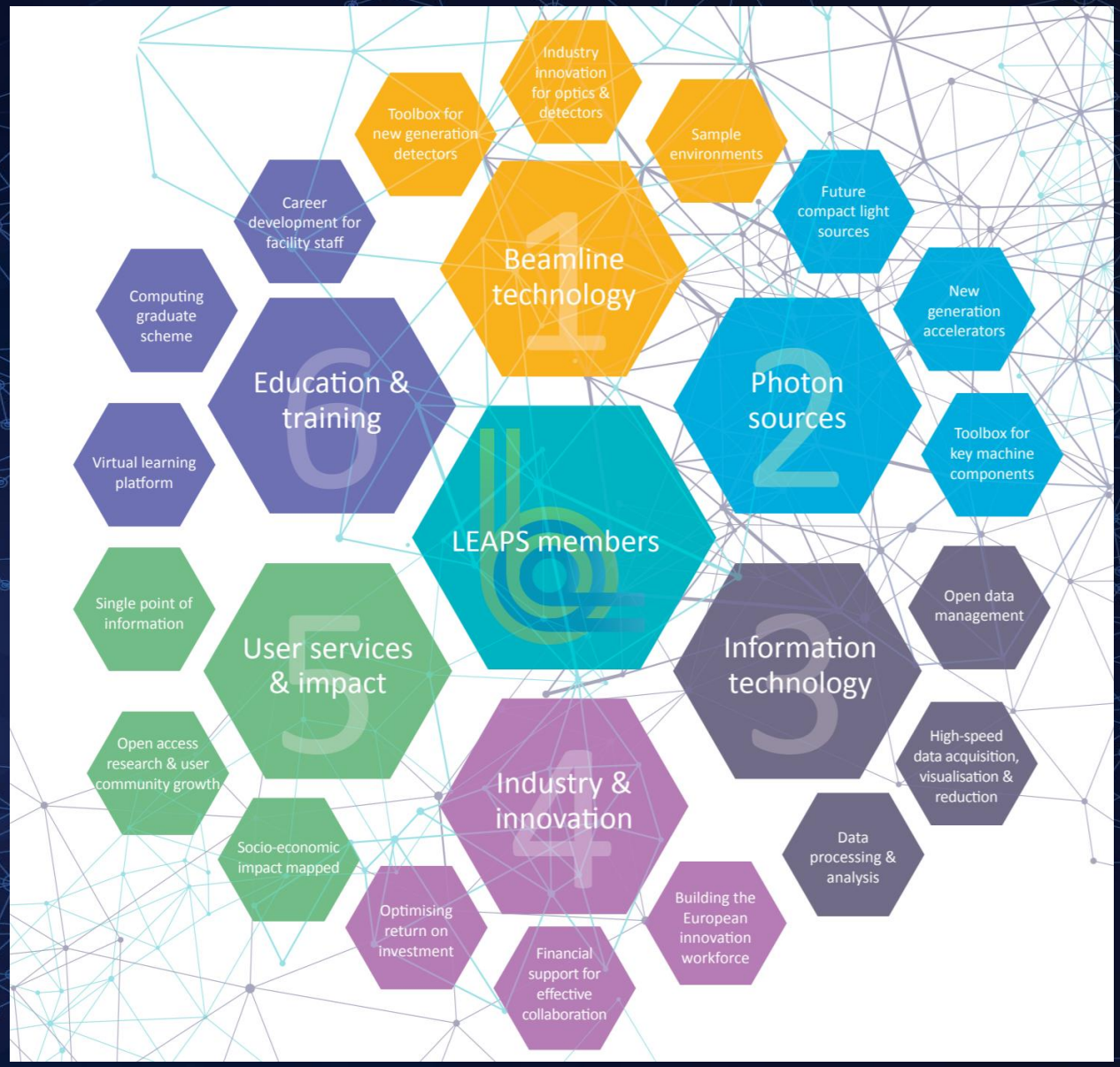
League of European Accelerator-based Photon Sources

+24000 users

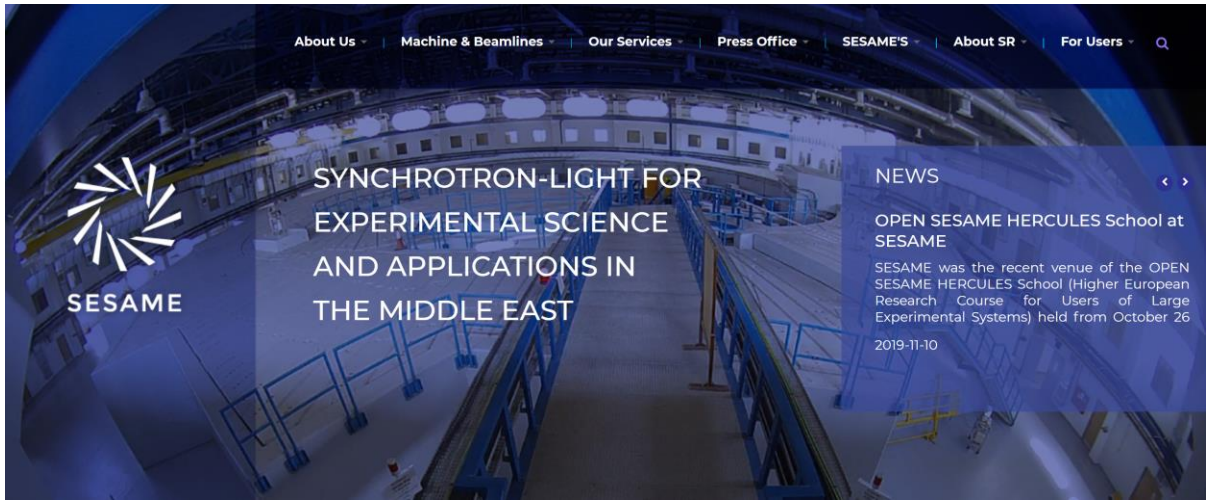
+300 operating End Stations

+700 M€ integrated operating budgets

+1 B€ integrated upgrade budgets for next decade



LEAPS welcomed SESAME as 1st associate lab



Signing Ceremony on 13-11-18
Helmut Dosch representing LEAPS
Rolf Heur, as SESAME Council chair, representing SESAME

Wed, 11/14/2018

At its first Plenary Meeting that is being held at DESY on 12-14 November, the Members of LEAPS (League of European Accelerator-Based Photon Sources) unanimously decided to grant SESAME Associate status. SESAME thus becomes the first Associate of LEAPS.

On signing the Declaration of Association to the LEAPS Consortium with Helmut Dosch, Chair of LEAPS and Chair of the DESY Board of Directors, Rolf Heuer, President of the SESAME Council, said that “it is a great honour for SESAME to be the first Associate of LEAPS; the scientific and technical development of SESAME and visibility of the Centre will greatly benefit from this association”.

LEAPS is a strategic consortium formed in 2017 on the initiative of the Directors of the Synchrotron Radiation (SR) and Free Electron Laser (FEL) user facilities in Europe. It grants the status of Associate for a period of three years, with multiple extensions being possible upon the Associate’s request and that of one Member of LEAPS.

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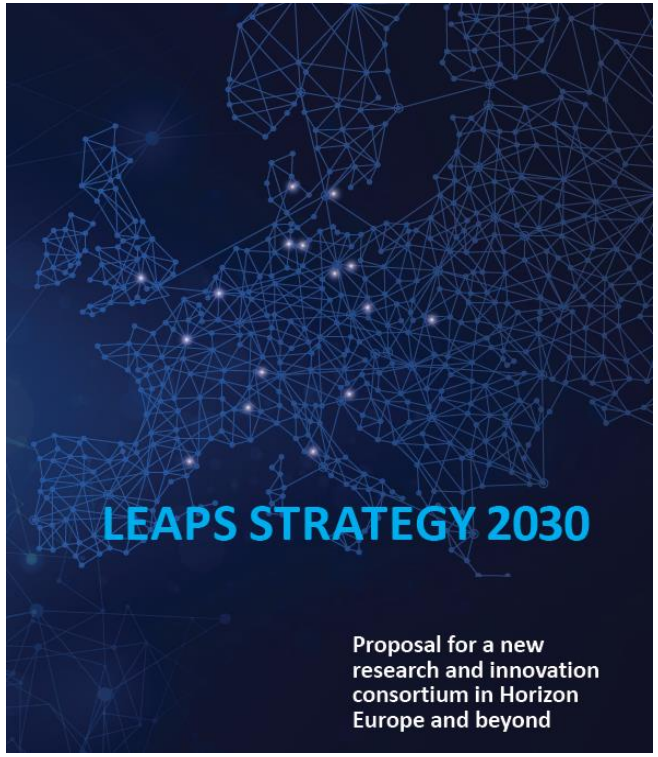
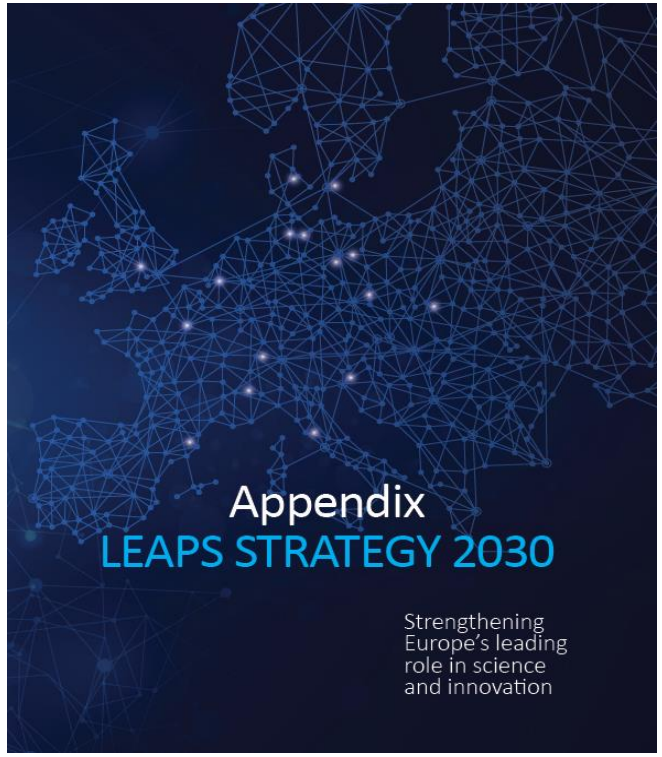
LEAPS achievements

Publication of LEAPS strategy 2030





https://www.leaps-initiative.eu/about/leaps_strategy_2030/

Published in 2018

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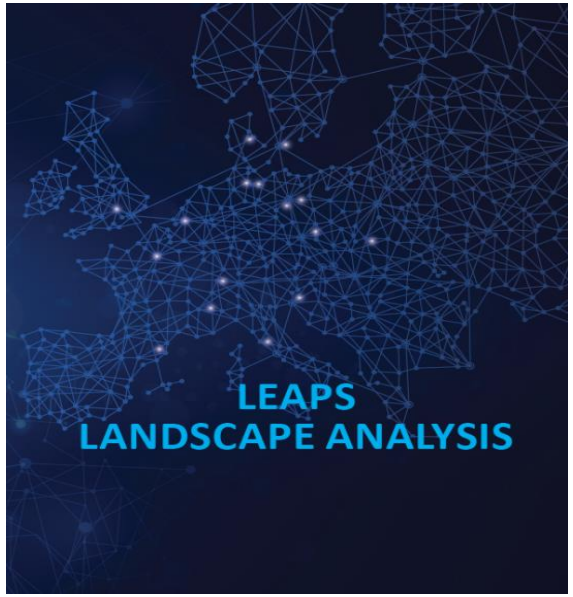
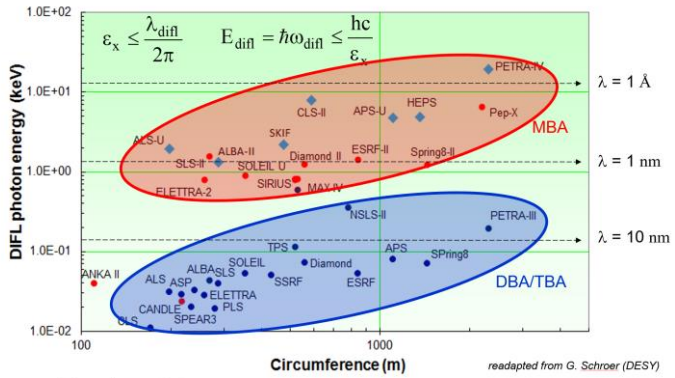
LEAPS achievements

Publication of LEAPS present landscape



	Facility	Location Start of user operation	Energy (GeV)	Emittance (nm rad)	No. of beamlines	No. of individual user visits (remote), projects and publications/year
Hard X-ray facilities	ESRF	Grenoble, France 1994	6	4	48 operational* 44 funded 50 target	9 024 (650) visits 1 258 projects 1 819 publications
	PETRA III	Hamburg, Germany 2010	6	1.2	20 operational 24 funded 27 target	4 300 visits 700 projects >380 publications
Medium X-ray facilities	ALBA	Barcelona, Spain 2012	3	4.2	8 operational 12 funded 20 target	1 766 (197) visits 256 projects 174 publications
	Diamond	Harwell, UK 2007	3	2.7	28 operational 33 funded	10 437 (4 188) visits 2 623 projects 1 047 publications
	MAX IV	Lund, Sweden 2016	3	0.33	5 operational 10 funded 18 target	User operations ramping up
	SOLEIL	St. Aubin, France 2008	2.75	3.9	29 operational	4 138 visits 687 project 614 publications
	Swiss Light Source	PSI, Villigen, Switzerland 2001	2.4	5.5	16 operational	3 134 visits 1 037 projects 620 publications
Soft X-ray facilities	ELETTRA	Trieste, Italy 1993	2.0–2.4	7–10	25 operational	1 320 visits 510 projects 570 publications
	BESSY II	Berlin, Germany 1998	1.7	7	31 operational	3 200 visits 850 projects >500 publications
	MAX IV	Lund, Sweden 2017	1.5	6	3 operational 5 funded 8 target	User operations ramping up
	SOLARIS	Krakow, Poland 2018	1.5	6	2 operational 4 funded 16 target	User operations ramping up
	ASTRID2	Aarhus, Denmark 2013	0.58	12	6 operational 7 target	120 visits 60 projects 45 publications
	DAFNE-Light	Rome (INFN-LNF), Italy 2000	0.51	280	5 operational 7 target	30 visits 15 projects 7 publications
	MLS	PTB, Berlin (PTB), Germany 2008	0.1–0.63	100	7 operational	90 visits 25 projects 10 publications



readapted from G. Schroer (DESY)

Courtesy of Riccardo Bartolini

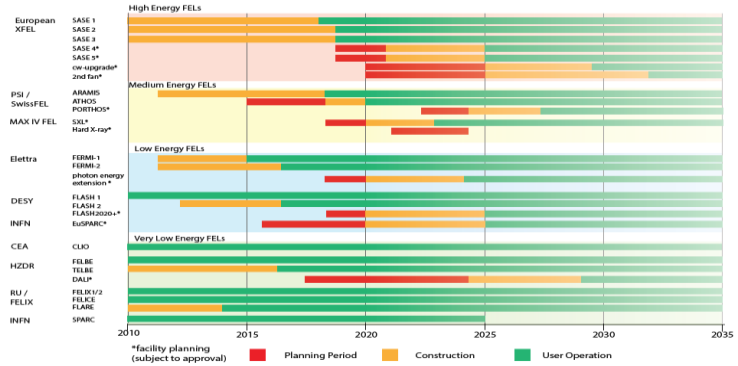


Fig. 5. Timeline of the existing FEL facilities, approved upgrades and plans for upgrades not yet approved (marked with an asterisk).

Facility	FELs lines operating in parallel	Location	Start user operation	Electron energy	Photon energy	Pulse properties	No. of exp. stations
European XFEL	SASE-1 SASE-2 SASE-3	Hamburg/ Schenefeld, Germany	2017 2018 2018	8.5–17.5 GeV	3.0– 20 keV	1–100 fs; 10*2700 pulses/s	2 2 2
SwissFEL	ARAMIS ATHOS	Villigen, Switzerland	2018 2020	2.1–5.8 GeV	1.8–12.4 keV 240–1930 eV	2–40 fs; 100 Hz	3 3
MAX IV	FemtoMAX (spontaneous radiation only)	Lund, Sweden		3.0 GeV	1.8–20 keV	100 fs; 10 Hz	3
FERMI	FEL-1 FEL-2	Trieste, Italy	2012 2016	1.5 GeV	15–90 eV 65–310 eV	seeded FEL 20–90 fs; 10–50 Hz	6
FLASH	FLASH-1 FLASH-2	Hamburg, Germany	2005 2016	0.4–1.25 GeV	26–300 eV 14–400 eV	10–300 fs; up to 10*800 pulses/s	5 2 (5 possible)
ELBE	FELBE TELBE	Dresden, Germany	2005 2016	15–40 MeV	5–250 meV 0.5–10 meV	0.5–30 ps; 13 MHz cw 0.5–30 ps; 13 MHz or 100 kHz cw	7 1
FELIX	FELIX 1/2 FELICE FLARE	Nijmegen, Netherlands	1993 2007 2013	15–50 MeV 15–50 MeV 10–16 MeV	8–400 meV 12–250 meV 0.8–12 meV	0.5–10 ps; 1 GHz/25 MHz, 20 Hz 0.5–10 ps; 1 GHz/16 MHz, 20 Hz 10–80 ps; 3 GHz/20 MHz, 20 Hz	12 2 4

High Energy | Medium Energy | Low Energy | Very low energy

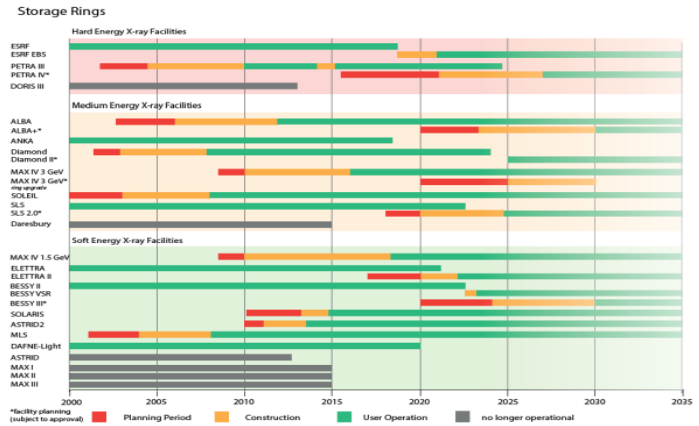


Fig. 4. Timeline of the existing storage ring facilities, approved upgrades and plans for upgrades not yet approved (marked with an asterisk).

https://www.leaps-initiative.eu/news/leaps_landscape_analysis/

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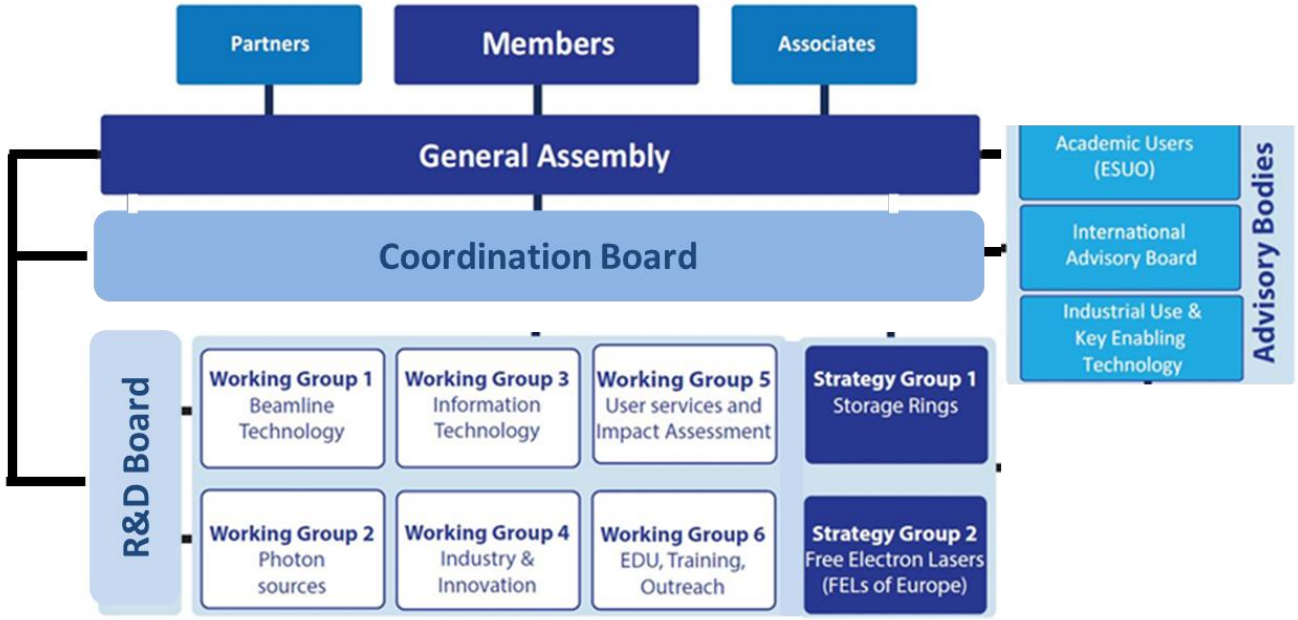
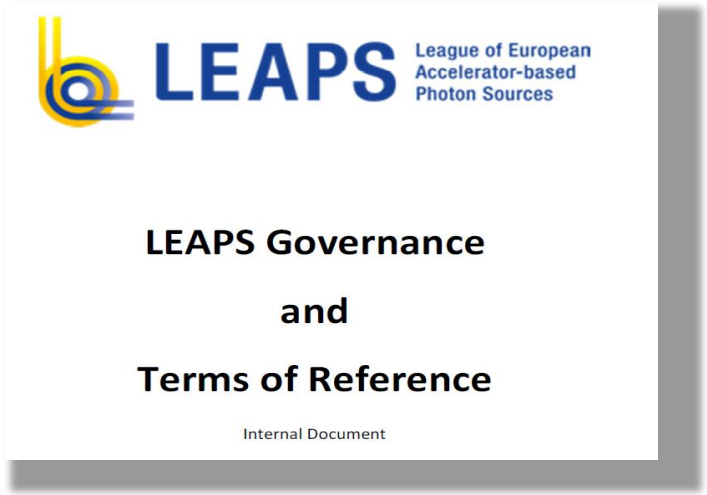
LEAPS achievements

Implementation of LEAPS organization





(Latest modifications still to be discussed and approved in GA6 tomorrow)

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On going LEAPS activities

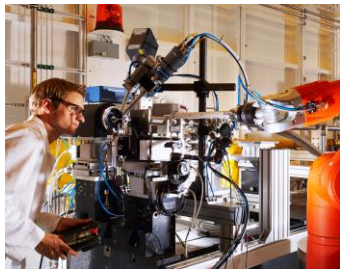
LEAPS-INNOV preparation

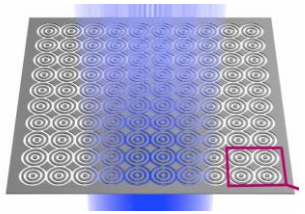
to be presented to INFRAINNOV-04-2020: Innovation pilots

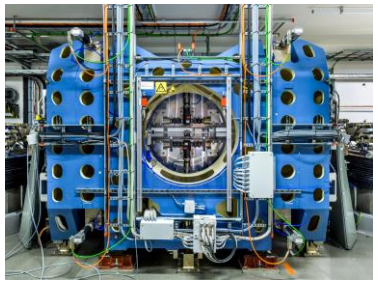
*…to kick-start the implementation of a **common strategy/roadmap for technological developments** required for improving their services through **partnership with industry***

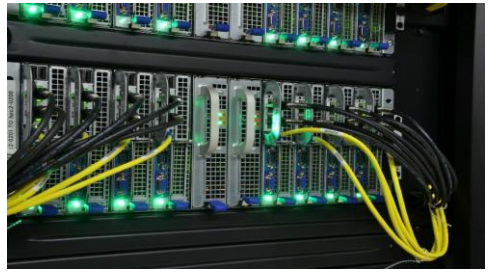
Technological developments for Beamlines, accelerators and data handling

XAFS Detectors
Superflat Mirrors
Gratings
Positioning/Scanning
Insertion Devices
Data Reduction and Toolbox



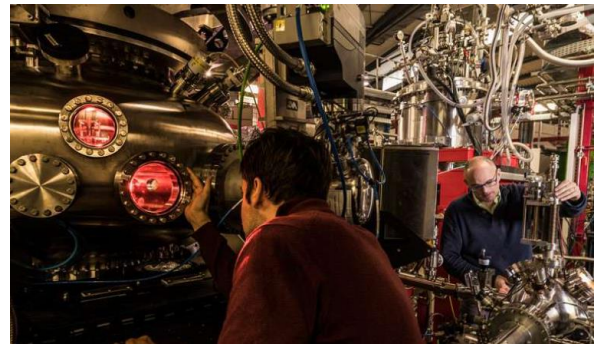






Programs for better service to

User communities
Industrial Innovation
Prepare **Competence Programs**
Benefit all MS
Reach out other communities



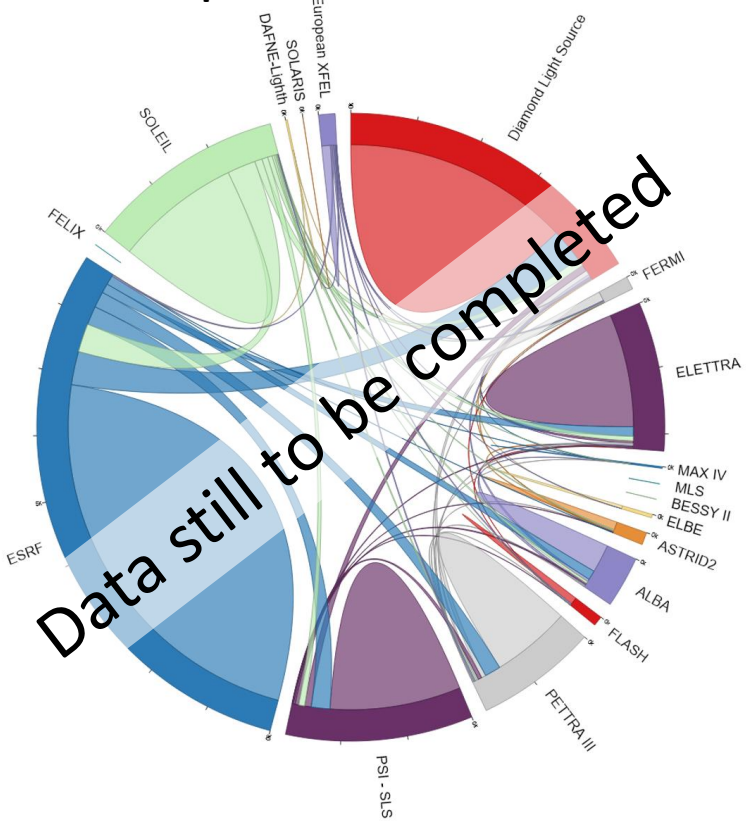
ALBA DESY. diamond Elettra Sincrotrone Trieste ESRF European XFEL FELIX HZB Helmholtz Zentrum Berlin HZDR Helmholtz Zentrum Dresden Rossendorf INFN ISA MAX IV PAUL SCHERRER INSTITUT PSI PTB SOLARIS SOLEIL SYNCHROTRON ESUO

On going LEAPS activities

Impact assessment and Standard data collection exercise

- **Impact assessment** + standard metrics in-kind project - Strong synergies with Calipso-plus and Ripaths
- **Data collection** from all LEAPS members done during last few months (WG5). Working on data consolidation:
  - Learn key challenges for metrics standardization (continue in Calipso plus)
  - Updated global LEAPS numbers w.r.t. Landscape analysis document

Common articles and complementarities between facilities



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On going LEAPS activities:

Organizing 1st LEAPS Conference

LEAPS

LEAPS meets Quantum Technology

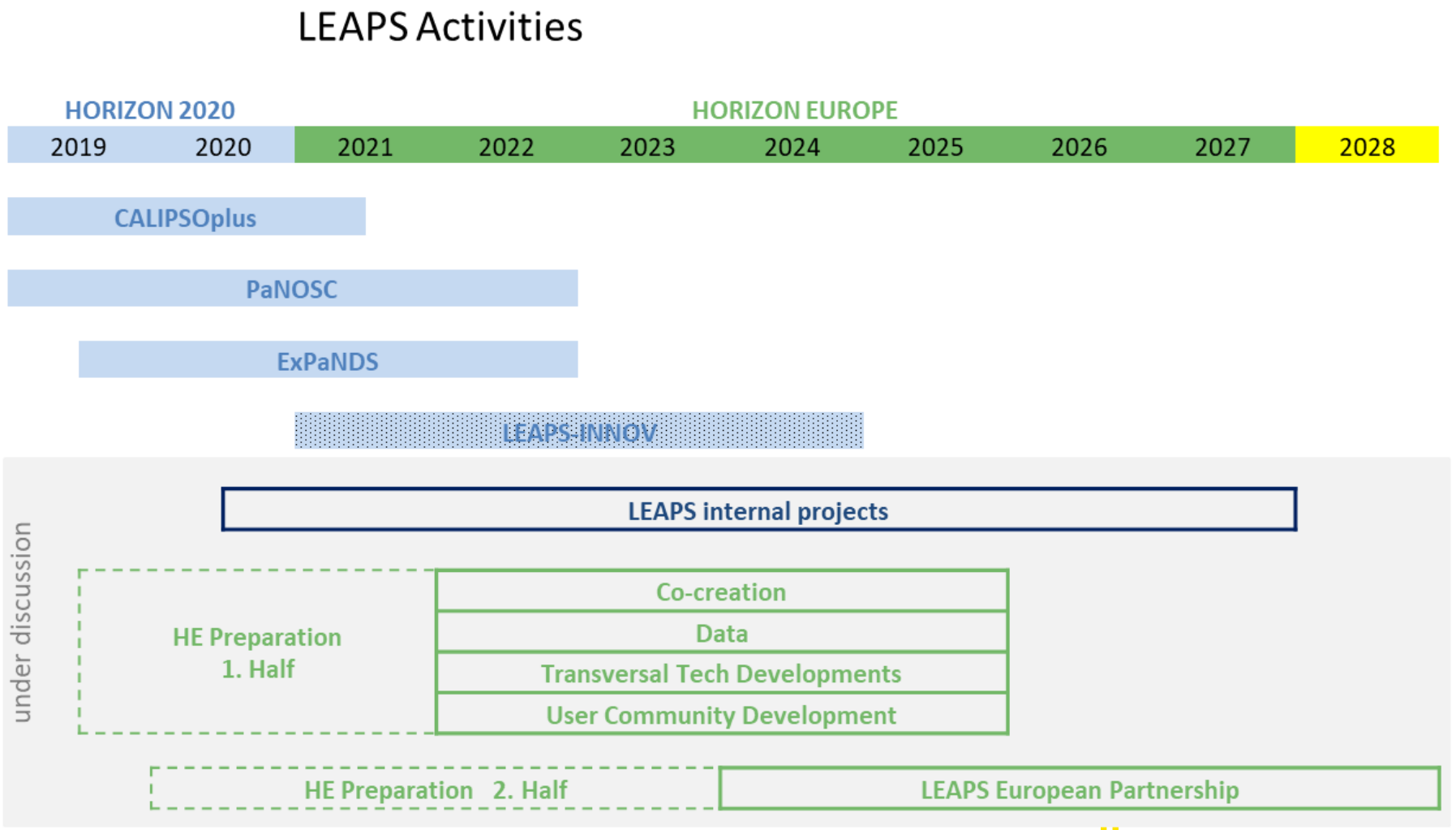
24-29 May 2020
Hotel Hermitage, La Biodola, Isola d'Elba, Italy

… More this afternoon

On going LEAPS activities

- New webpage in preparation

LEAPS plans for 2020(+)



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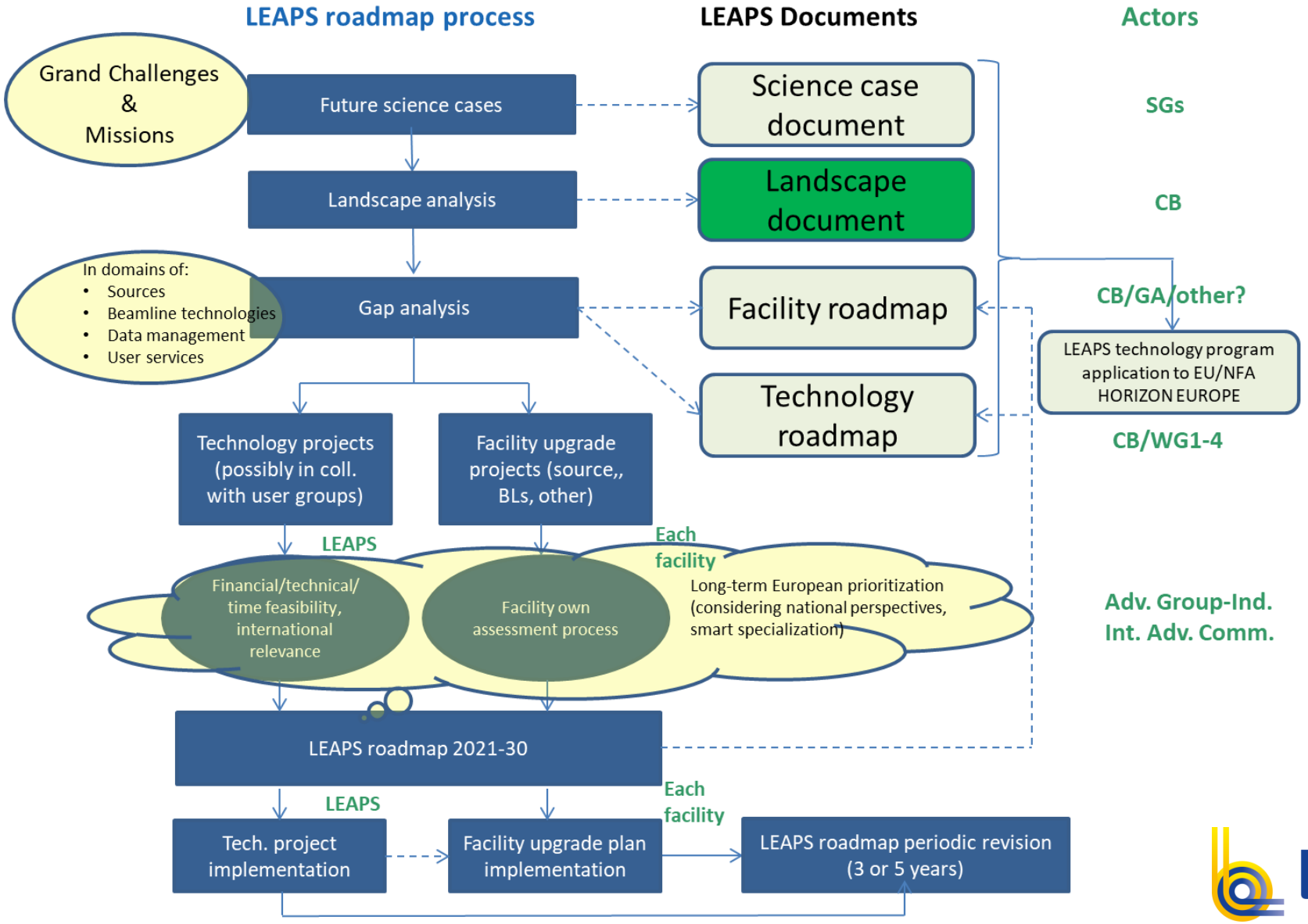
LEAPS Roadmap Process



Planned to be taken up again in 2020

Involving all WGs

LEAPS CONNECTIONS for Co-Creation

Horizon Europe and beyond

EUROPEAN COMMISSION

10 National Funding Agencies + ESRF/EUXFEL members
National roadmaps

All EU Member States
LEAPS benefits all

Experienced Users
Including research institutions and Universities

ESUO
EUROPEAN SYNCHROTRON AND FEL USER ORGANISATION

+ New User Communities

Industry as provider, user and collaborator

Other RI networks as

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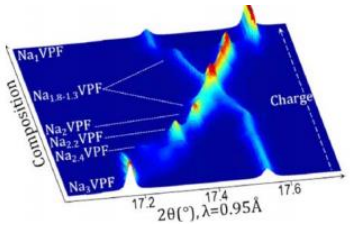
Competence Pyramid for facing a challenge

Industry

Society

Individuals

Science driven



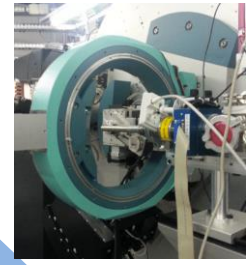
Science Case

Technological and scientific tools including their state-of-the-art **developments**

RIs instruments and **people** (LEAPS and beyond), **User** groups (from all MS)
Industry as provider and as developer

Contributions from

LEAPS, partners, EU commission, industry



Horizon Europe
Programme Structure

EUROPEAN COMMISSION

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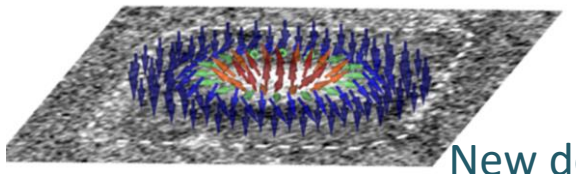
With:

National Funding Agencies & national Roadmaps

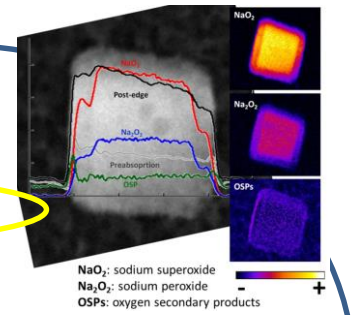
LEAPS plans for 2020(+)
Where we will be in few years from now – on going research programs
(examples are indicatives)



Spintronic

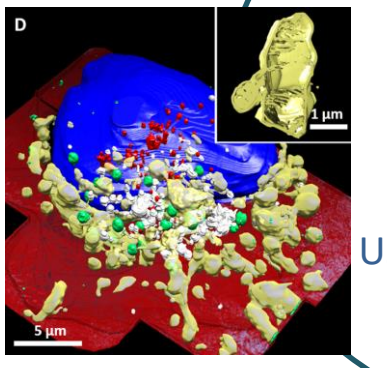
High brilliance SR
+ FEL with two color beams
New detectors developed by EU industry
Data toolbox
Involvement of research groups from excellence research Institutions

Batteries



New Insertion Devices
New mirrors
Data pipeline
Use of international Open Data repository
Use of neutron and photon probing
Participation of research institutions from non-LEAPS MS
Addressing Industrial R&D needs

Drugs for Cancer



New Insertion Devices
High precision scanning
Smart specialization of different facilities
Data toolbox
Software and AI
Use of Microscope platforms
Pharma industry

Training scientists
Qualifying industries
Creating links
Benefiting all

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LEAPS long-term

- Long-term (vision)
  - Have LEAPS consolidated as a key actor in European landscape, likely as a European Partnership

What is needed for this: Success in

- Final run of H2020 (LEAPS INNOV)
- **Identifying key techniques matched to HE M/C, defining and developing specific projects in CO-CREATION with HE**
- Showing added value on ‘LEAPS benefits all’
- Demonstrating effective inclusiveness
- Demonstrating successful industrial developments
- Demonstrating training capacities
- Rising all Member States interest in supporting our activities

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Conclusions

*LEAPS has stepped-**in with a new pan-European cooperation for research***

*While shaping in collaboration with our connections which will be the best instrument for reaching our goals and aiming at an **European Partnership** status*

*We show our **strong will** and **ambition** to **cooperate** in addressing EU priorities. We aim at getting a powerful voice in Europe in the medium and long term and a visible place in Europe.*

So let us continue along this path.

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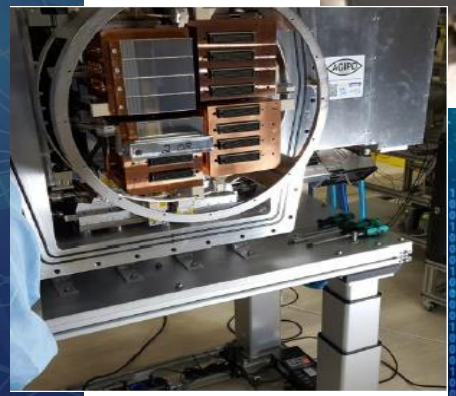
LEAPS
League of European
Accelerator-based
Photon Sources
Tak
Tack
Thanks
Dziękuję
Bedankt
Danke
Merci
Grazie
Gracias
شكك

LEAPS achievements: roadmap “backbone”



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