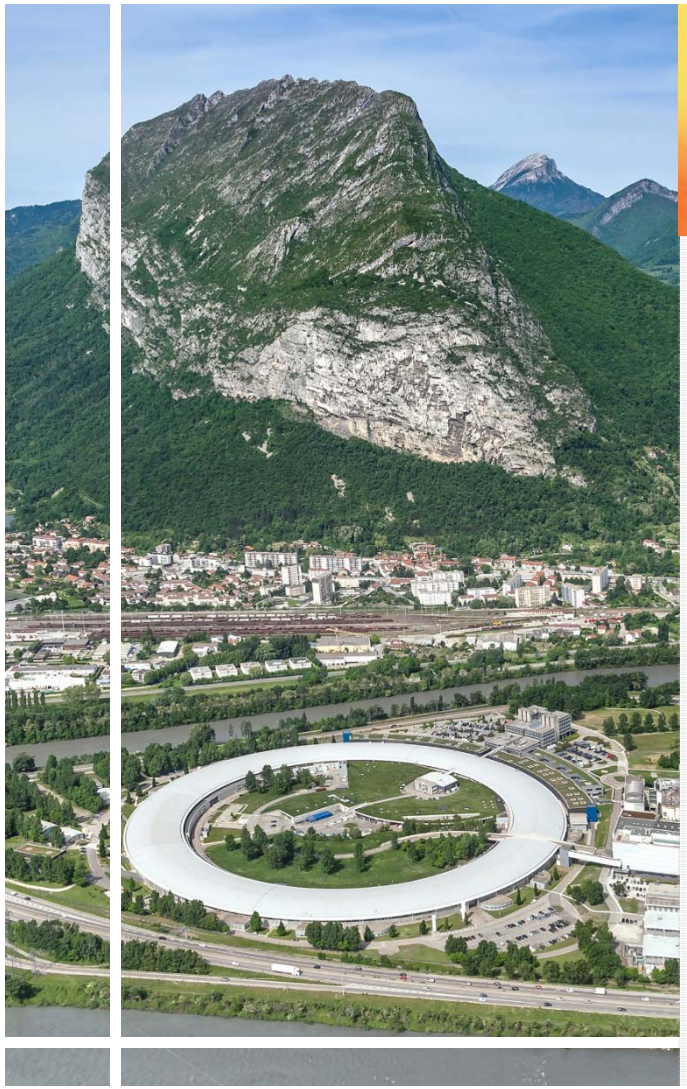
ESRF | The European Synchrotron



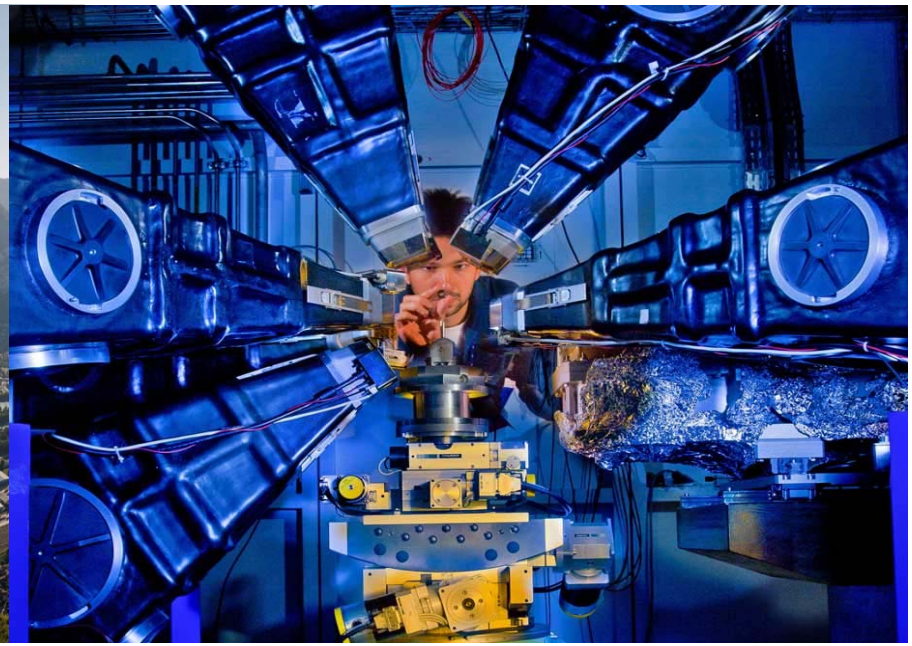
THE AFRICAN LIGHT SOURCE CONFERENCE AND WORKSHOP

16 - 20 NOVEMBER 2015, ESRF GRENOBLE FRANCE

The ESRF as a model of international cooperation

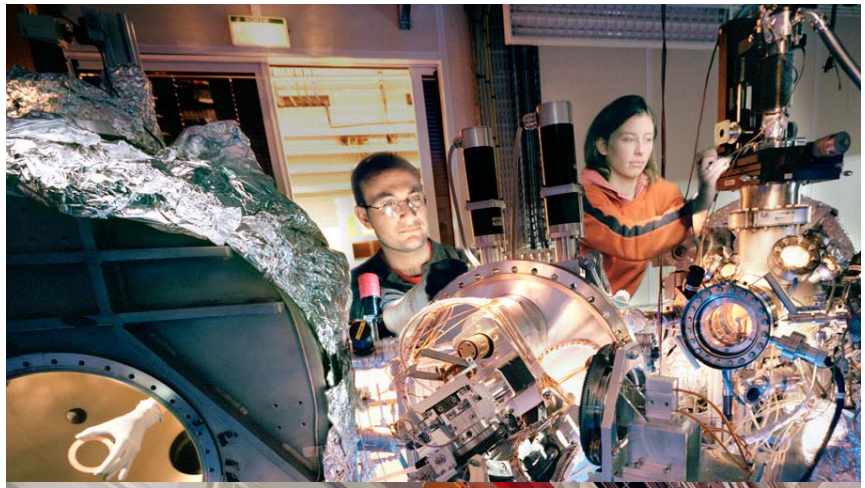
INTERNATIONAL YEAR OF LIGHT 2015

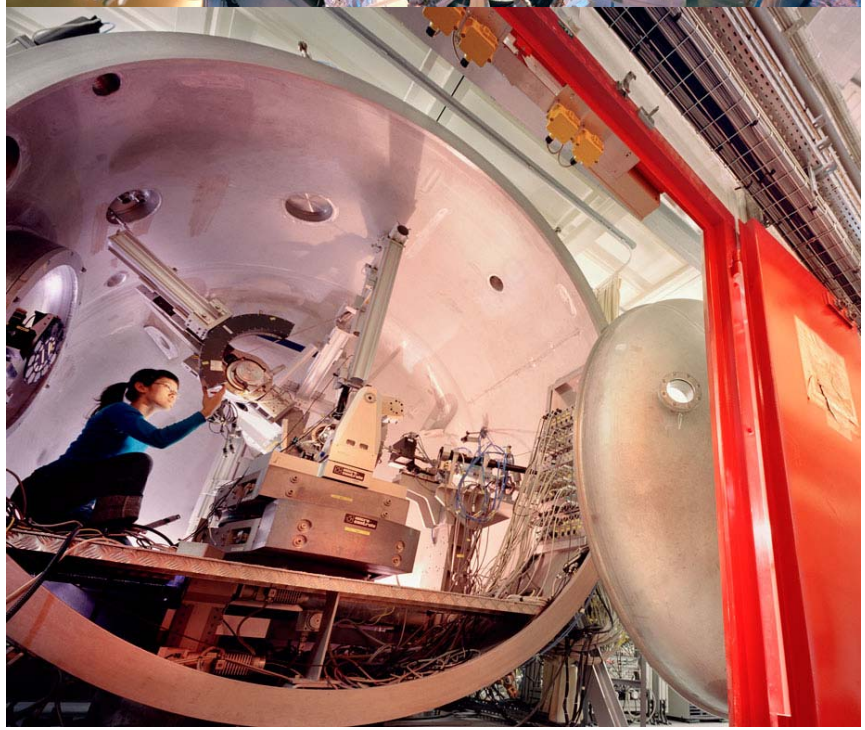
SUMMARY



- History
- The ESRF today: facts and figures
- Governance
- Impact

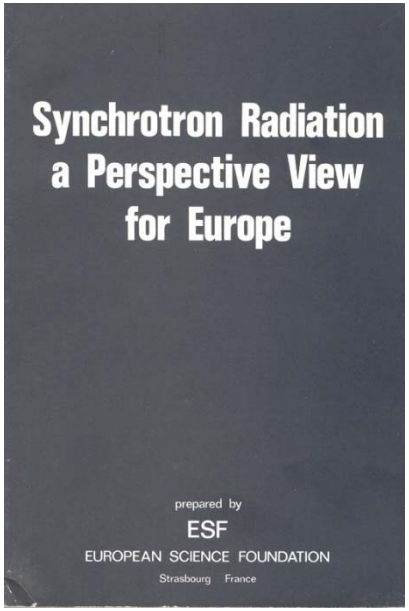
ESRF MISSION

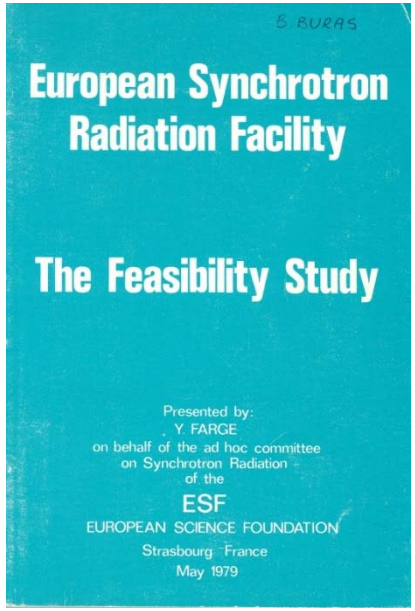




- design, construct, operate and develop state-of-the-art X-ray synchrotron instruments and facilities to the benefit of the scientific communities of the Member and Associate countries, exploiting the performances of the ESRF synchrotron storage ring source
- support the use of ESRF X-rays by industry from Member and Associate countries to strengthen its competiveness in the global scale
- train the next generation of synchrotron scientists, engineers and technical staff

HISTORY

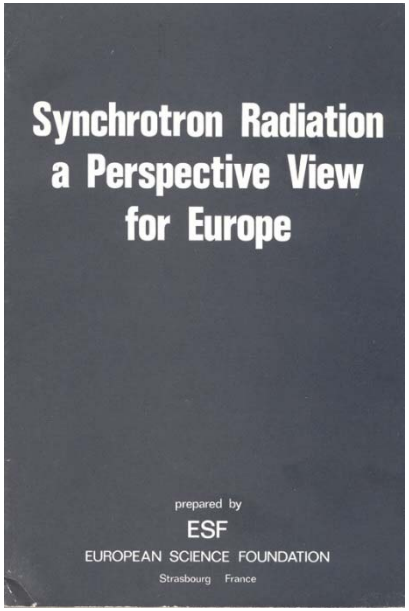


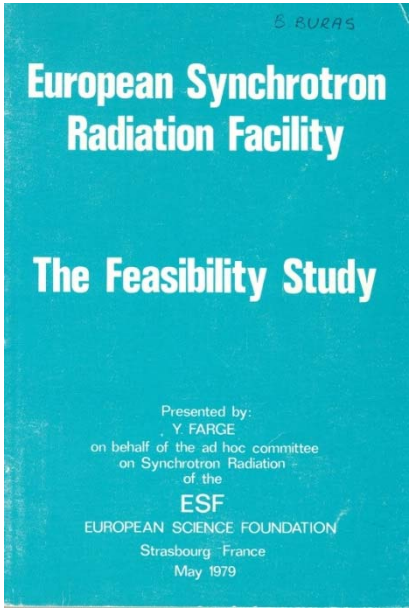


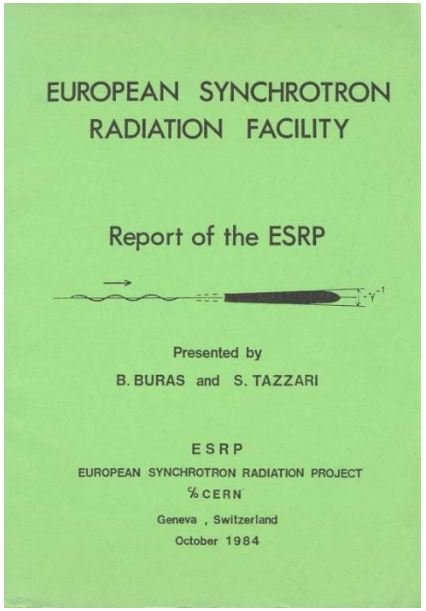
1977 1979

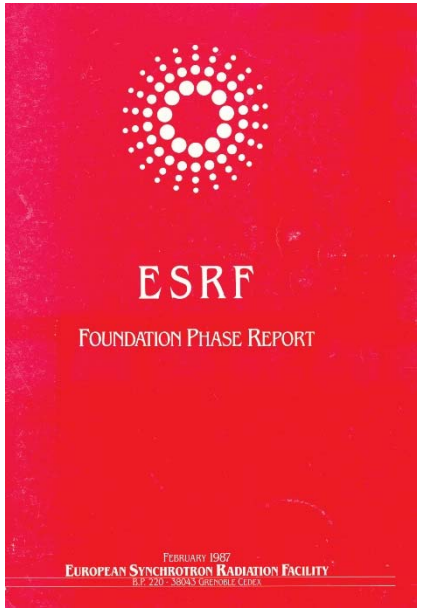
- **1975**: 1st meeting to consider the feasibility of producing hard X-rays with high brilliance, held under the auspices of the European Science Foundation (ESF).
- **1977**: The ESF GA approved the report recommending a feasibility study for an advanced European synchrotron radiation laboratory. Set up of ad-hoc Committee on Synchrotron Radiation and two sub-groups for Machine and Instrumentation.
- **1979**: The results of the feasibility study published in a four-volume report, the “Blue Book”.

HISTORY









1977 1979 1984 1987

- **1984**: Study Group published a report describing in detail the scientific goals, the Machine, the experimental facilities and the time schedule for construction, the “Green Book”.
- **1985**: France, Germany and the UK decided for Grenoble and signed the “Memorandum of Understanding”, legal basis of the ESRF Foundation Phase. Italy and Spain joined early in 1986.
- **1987**: Publication of the Foundation Phase Report, “Red Book”, prepared by the ESRF team, enabling the **start of construction on 1 January 1988**.

HISTORY

1986

HISTORY

1988


1989

HISTORY

1989

First Users' Meeting – 1989


1989


1990

1991

Accession of the Netherlands after founding with Belgium the BeNeSync Consortium

28 February 1992: First electron beam in the ring and first X-ray beam in a beamline. Commissioning phase. Design goal reached of 100 mA current in storage ring.

HISTORY

September 1994: The ESRF opened its doors to users, offering 15 operational beamlines. Storage ring current raised to 150 mA; X-ray brilliance reached 1019 photons/mm2/mrad2/0.1%bw.

HISTORY

30 September 1994:

Inauguration ceremony

1996:

Storage ring current raised to 200 mA; X-ray brilliance reached
1020 photons/mm2/mrad2/0.1%bw.

HISTORY

1998:

End of construction phase.

40 beamlines are made available to users.


ESRF NEWSLETTER

APRIL 1998 | EUROPEAN SYNCHROTRON RADIATION FACILITY | N° 30

SYNCHROTRON RADIATION 50 years

INTERNATIONAL CONFERENCE

Highlights in X-Ray Synchrotron Radiation Research

17-21 November 1997
Grenoble, France (see page 3)

IN THIS NEWSLETTER

Reports
from workshops on Magnetism (page 13), X-ray Imaging (page 17) and High Pressure (page 25).

A review
of the Collaborating Research Groups at the ESRF (page 32)

THE NEWS MAGAZINE OF THE ESRF - ALSO AT http://www.esrf.fr

HISTORY


ESRF | The European Synchrotron
SIGNING CEREMONY
OF THE PROTOCOL OF ACCESSION
OF THE RUSSIAN FEDERATION

HISTORY

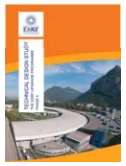
- **Dec. 2008** Decision to launch the Upgrade Programme

- **2009-2015** Upgrade Programme Phase I
  on time and within budget

- **2012** New design for
  the storage ring

- **June 2014** Accession of Russia

- **2015** ***ESRF-EBS programme***



HISTORY

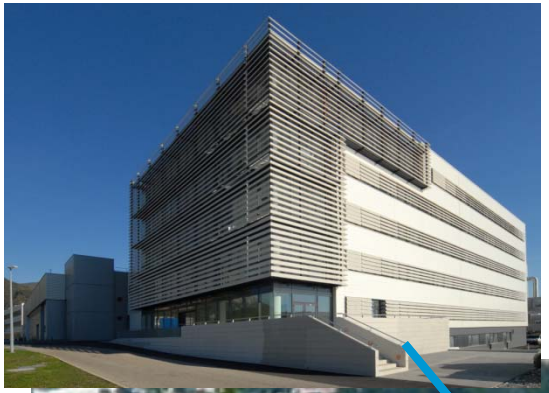
THE EUROPEAN PHOTON AND NEUTRON – EPN - SCIENCE CAMPUS

THE EUROPEAN PHOTON AND NEUTRON – EPN - SCIENCE CAMPUS

PSB Building named after Carl-Ivar Brändén (1934–2004) ESRF Director (1992-1997)

The PARTNERSHIP for STRUCTURAL BIOLOGY (PSB), established in 2002 between EMBL, ESRF, IBS and ILL, provides a unique environment for state-of-the-art integrated structural biology.

THE EUROPEAN PHOTON AND NEUTRON – EPN - SCIENCE CAMPUS



SCIENCE BUILDING (2014)

- **Soft Condensed Matter**
- **IRT – Nanoelec**
- **Common Chemistry Labs**
- **Etc.**

The SCIENCE BUILDING, donated by the French State and the Local Authorities, hosts Collaborations and Partnerships to create new opportunities for ESRF and ILL users

THE ESRF AND ITS NEIGHBOURS

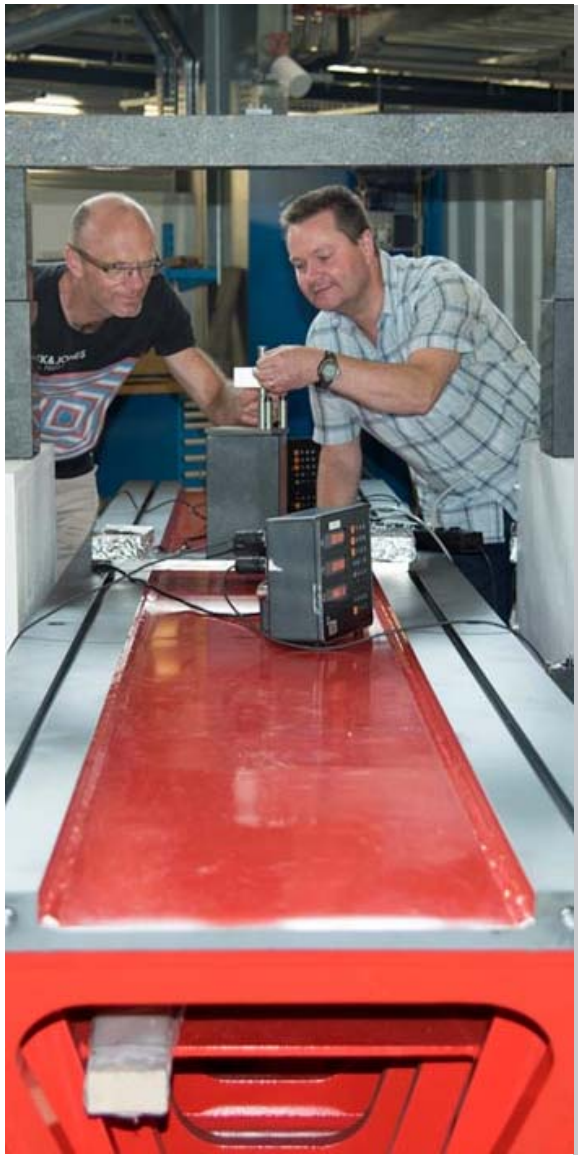
Large scale European laboratories

Academic partners

Research organisations

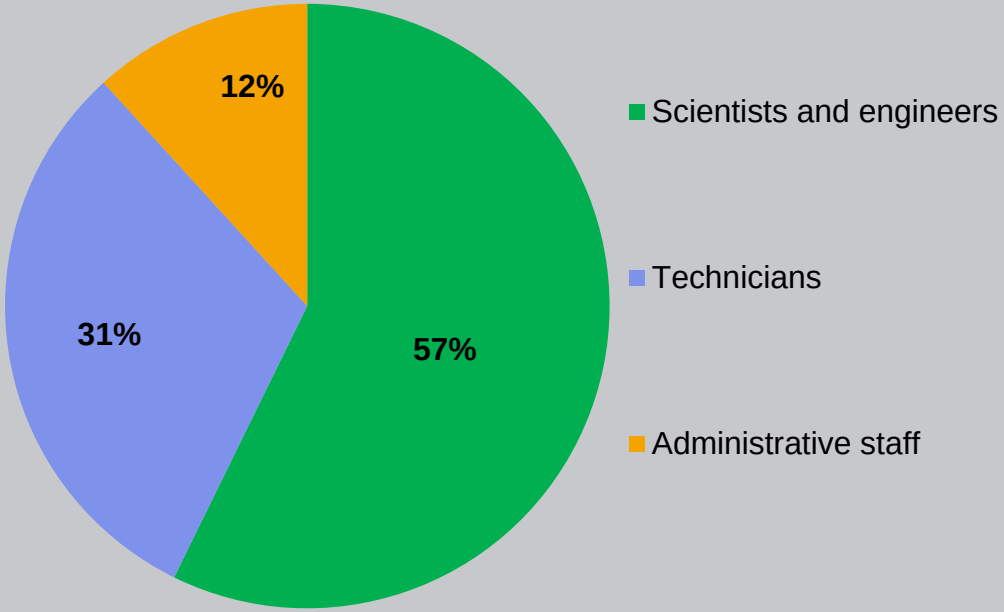
Local Authorities

THE ESRF TODAY: FACTS AND FIGURES

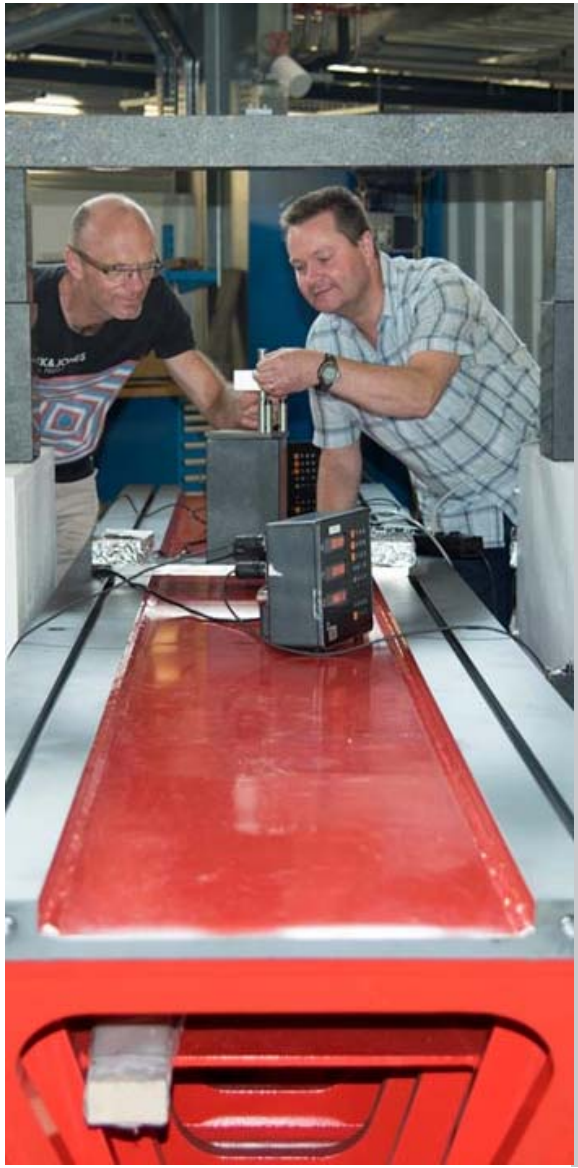


Annual budget and staff:

- ~100 M€, incl. Upgrade Programme
- ~630 staff, ~550 with technical background, incl. ~60 post-docs and ~50 PhDs



THE ESRF TODAY: FACTS AND FIGURES



Annual budget and staff:

- ~100 M€, incl. Upgrade Programme
- ~630 staff, ~500 with technical background, incl. ~60 post-docs, ~50 PhDs

Chemistry 2009 and 2012

Scientific Interest

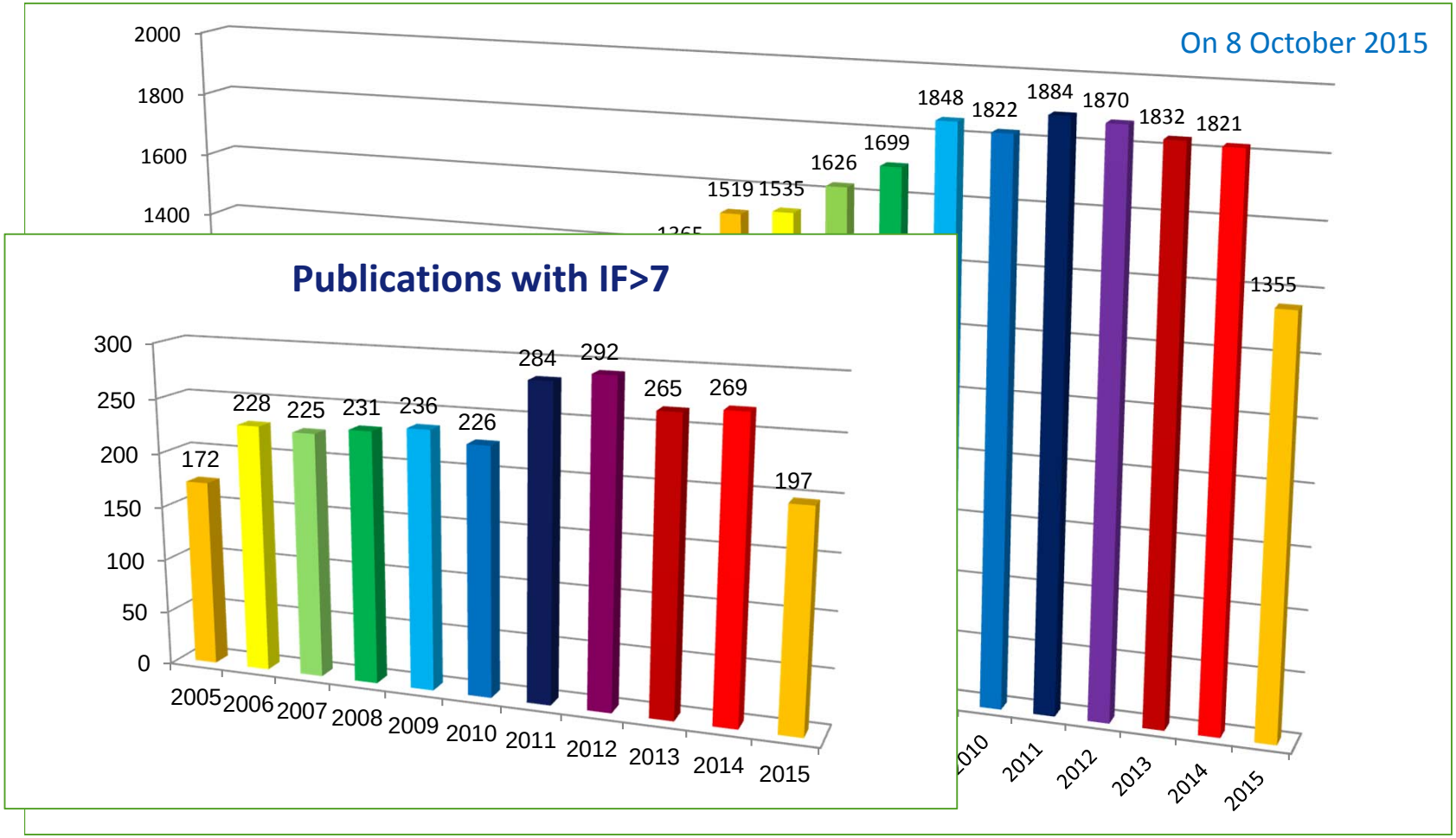
- 6 500 individual users' visits / year: ~4 000 individual users
- 2 000 scientific proposals/year : 900 accepted, 1 550 experimental sessions

Scientific Excellence

- Access based on scientific excellence
- 4 Nobel prizes from work carried out at the ESRF
- ~ 30 publications in Nature and Science every year
- ~ 1 900 publications per year: ~ 5 every day!

- 26 570 refereed papers in the period 1994-2015!

Number of ESRF Publications



THE ESRF TODAY: FACTS AND FIGURES

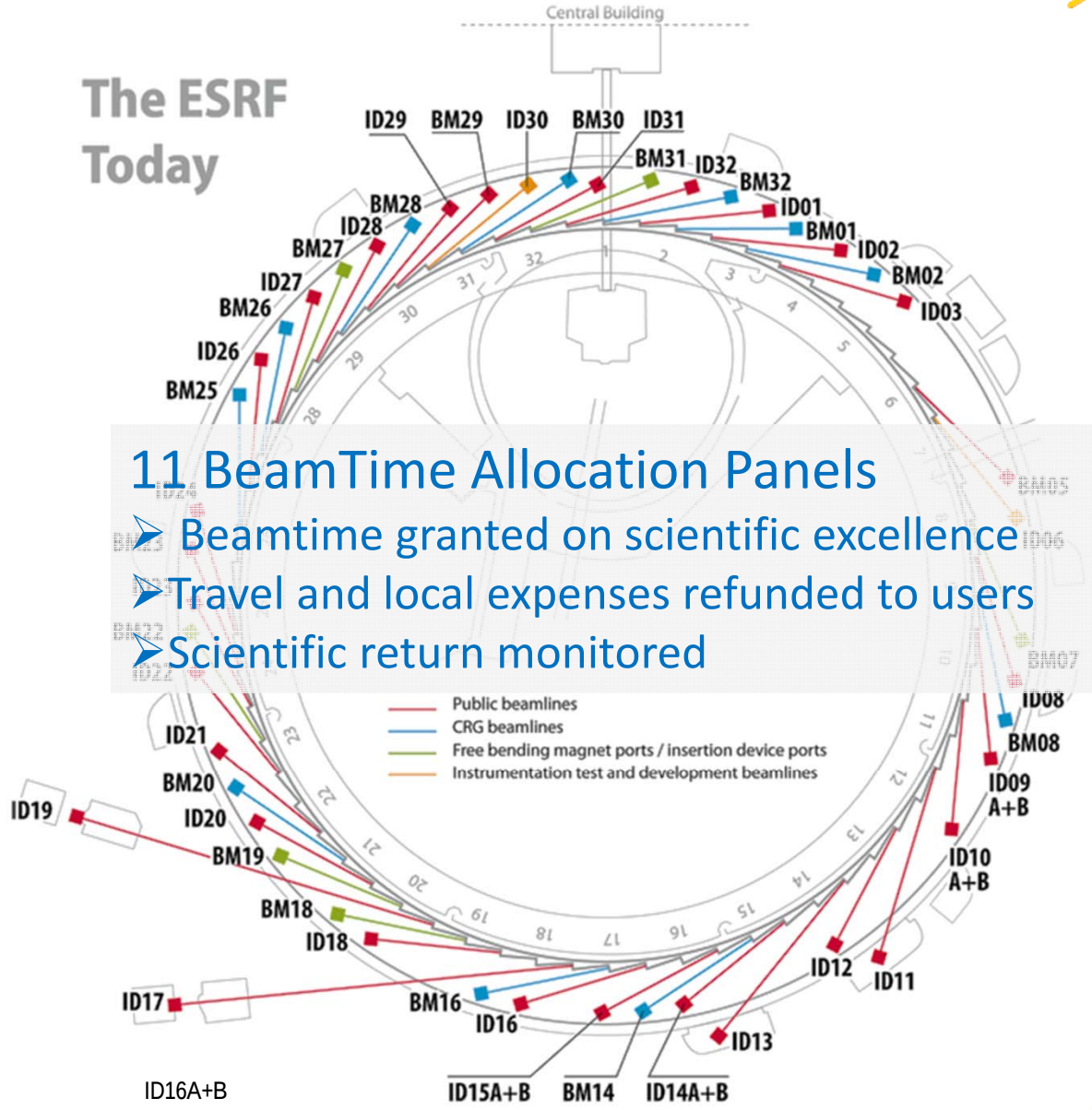
Research in all areas of condensed matter, physics and chemistry, soft matter, materials and life sciences on **43 specialised beamlines**:

- 30 PUBLIC
- 13 CRG (Teams from Member States)

Proprietary Research possible but paid for. No peer reviewing and results are confidential.

Limits (max):

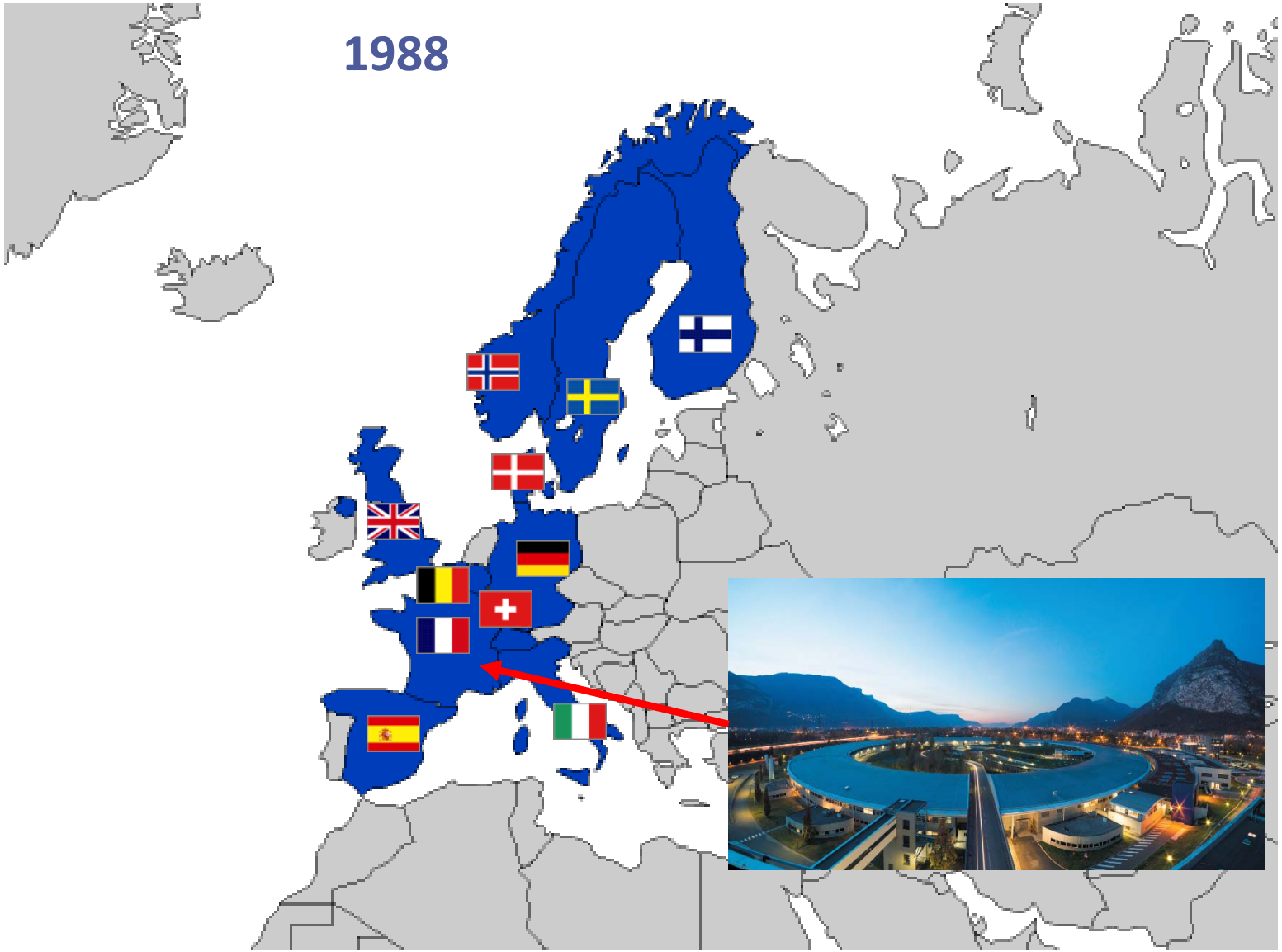
- 10% overall available beamtime
- 30% beamtime available per beamline



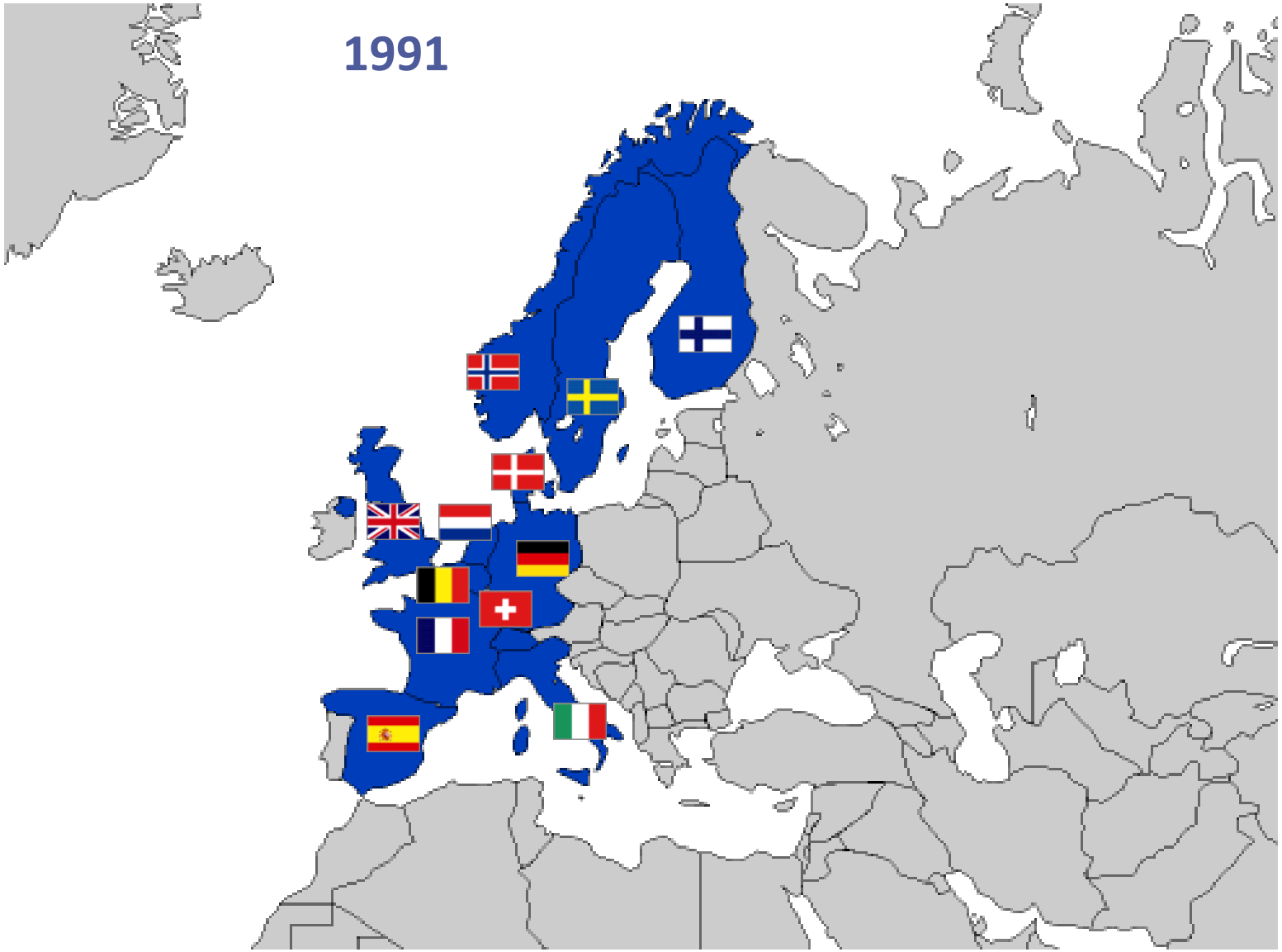
11 BeamTime Allocation Panels

- Beamtime granted on scientific excellence
- Travel and local expenses refunded to users
- Scientific return monitored

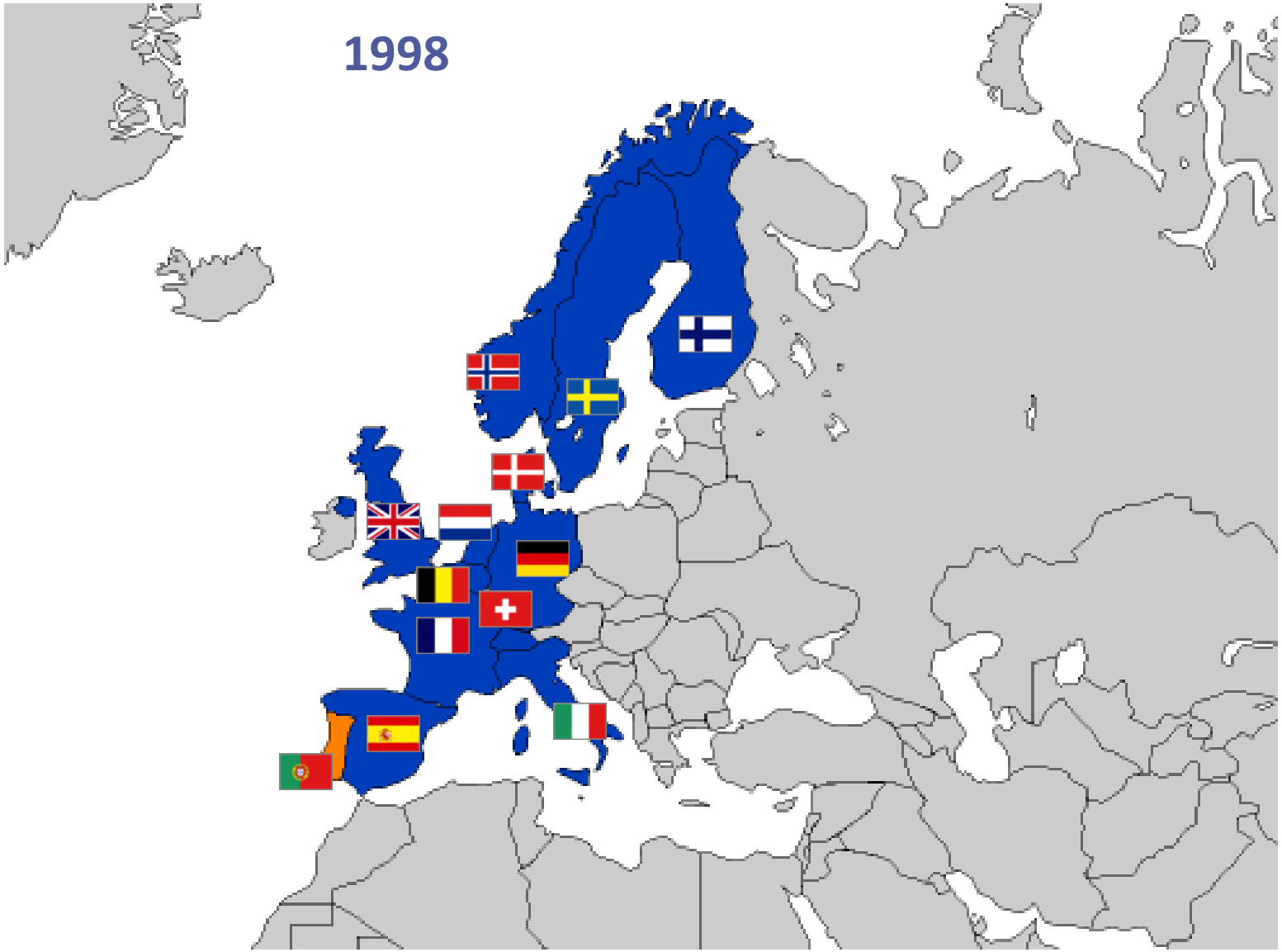
THE ESRF TODAY: FACTS AND FIGURES



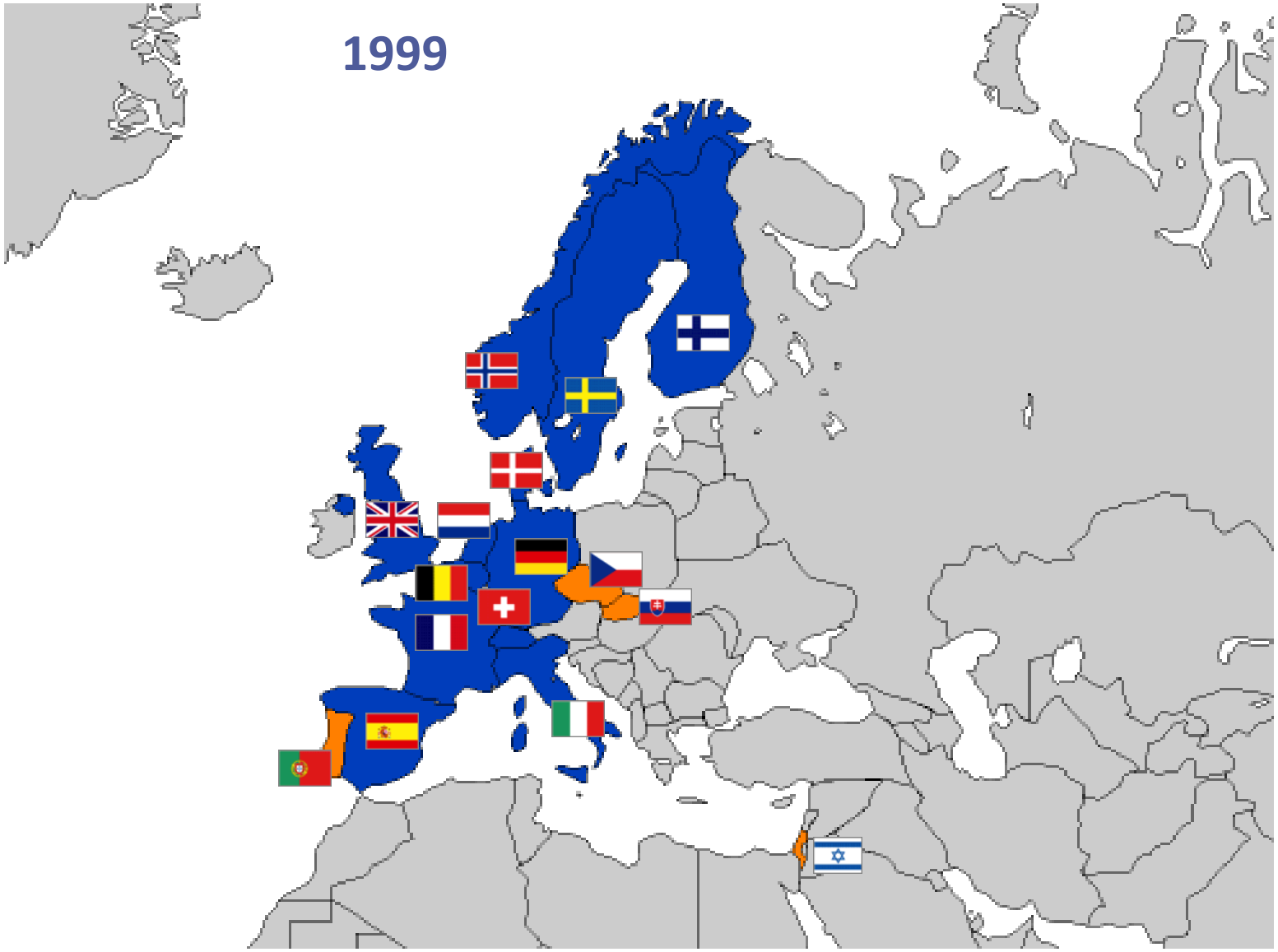
THE ESRF TODAY: FACTS AND FIGURES



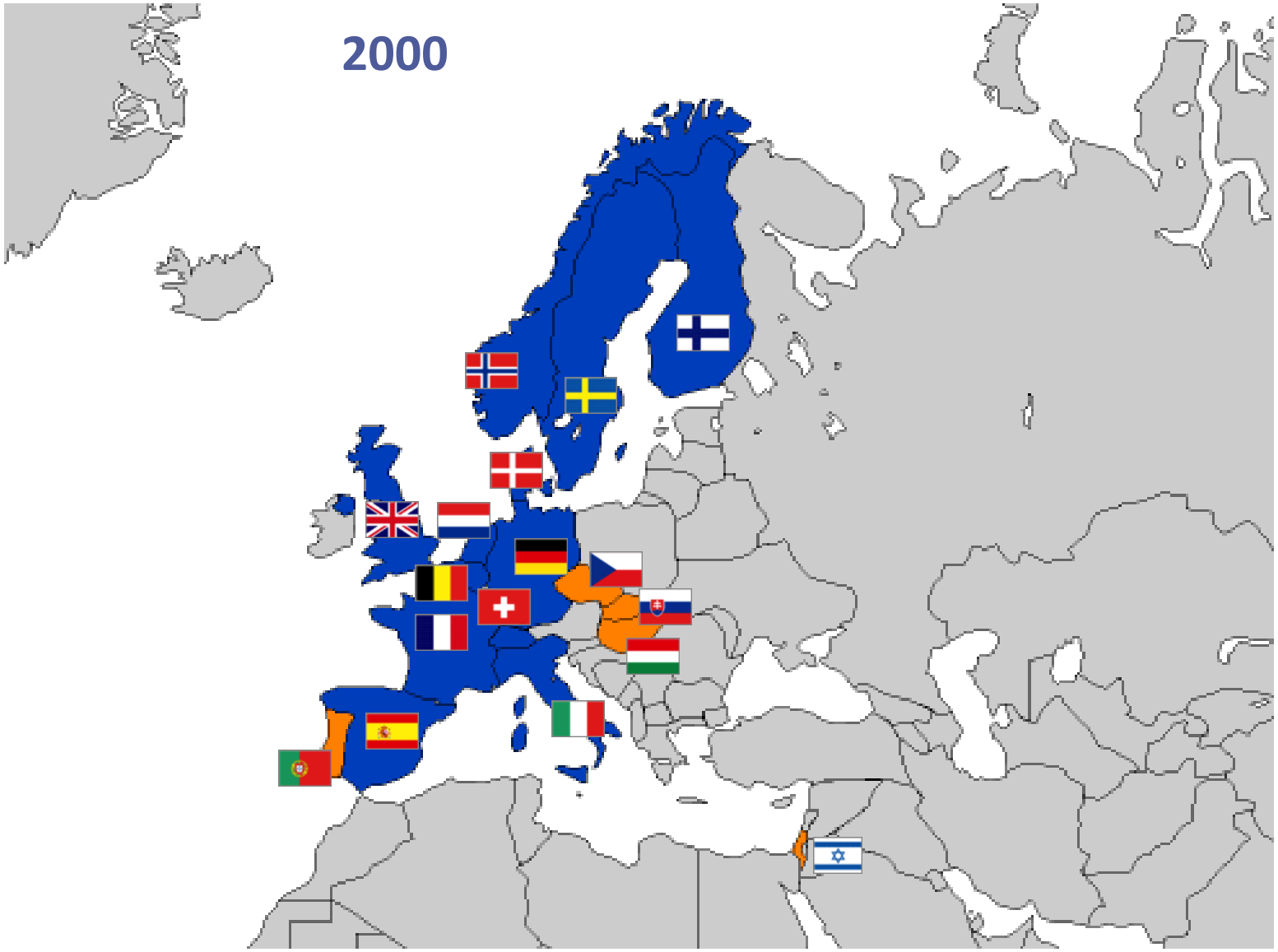
THE ESRF TODAY: FACTS AND FIGURES



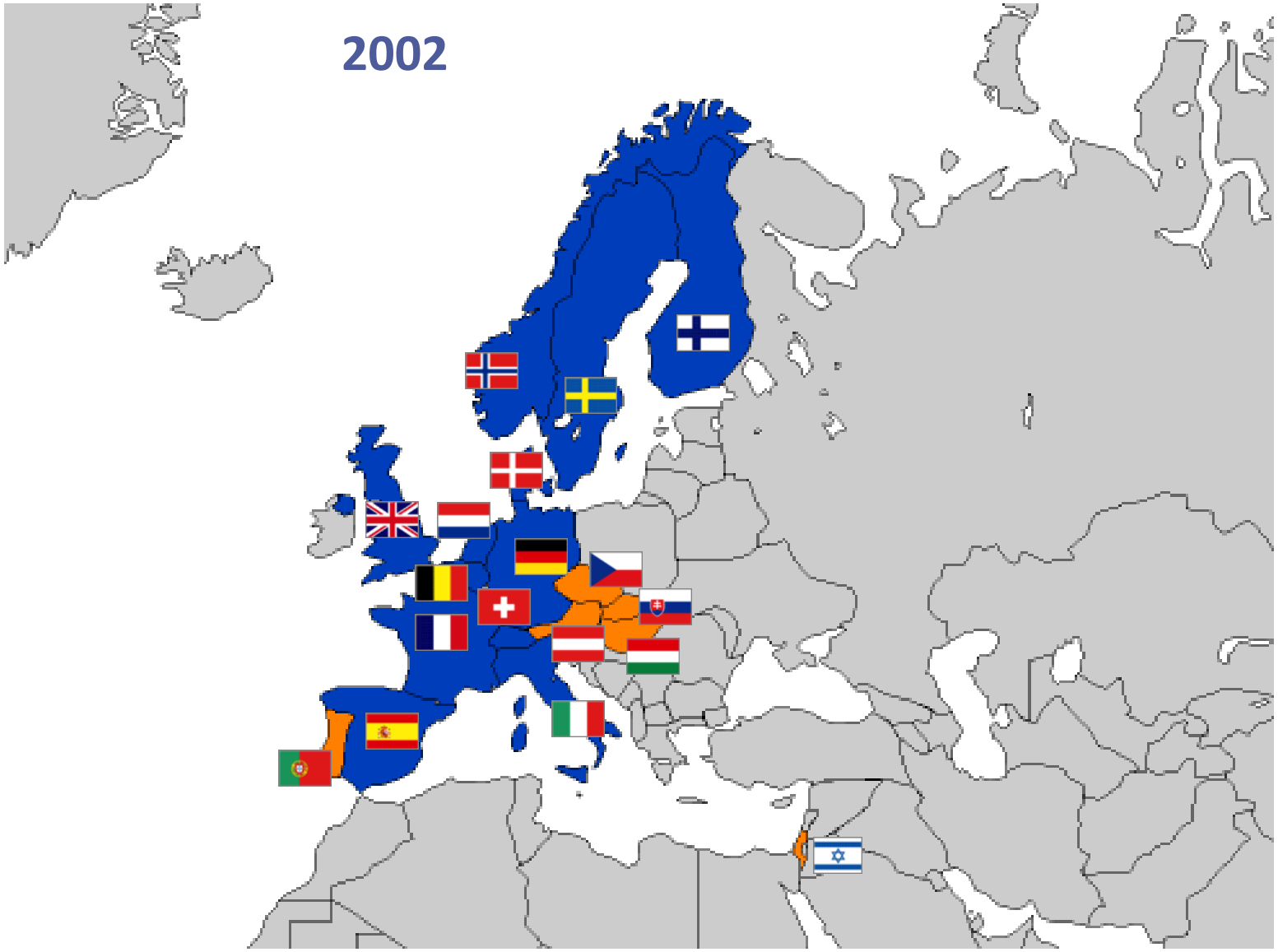
THE ESRF TODAY: FACTS AND FIGURES



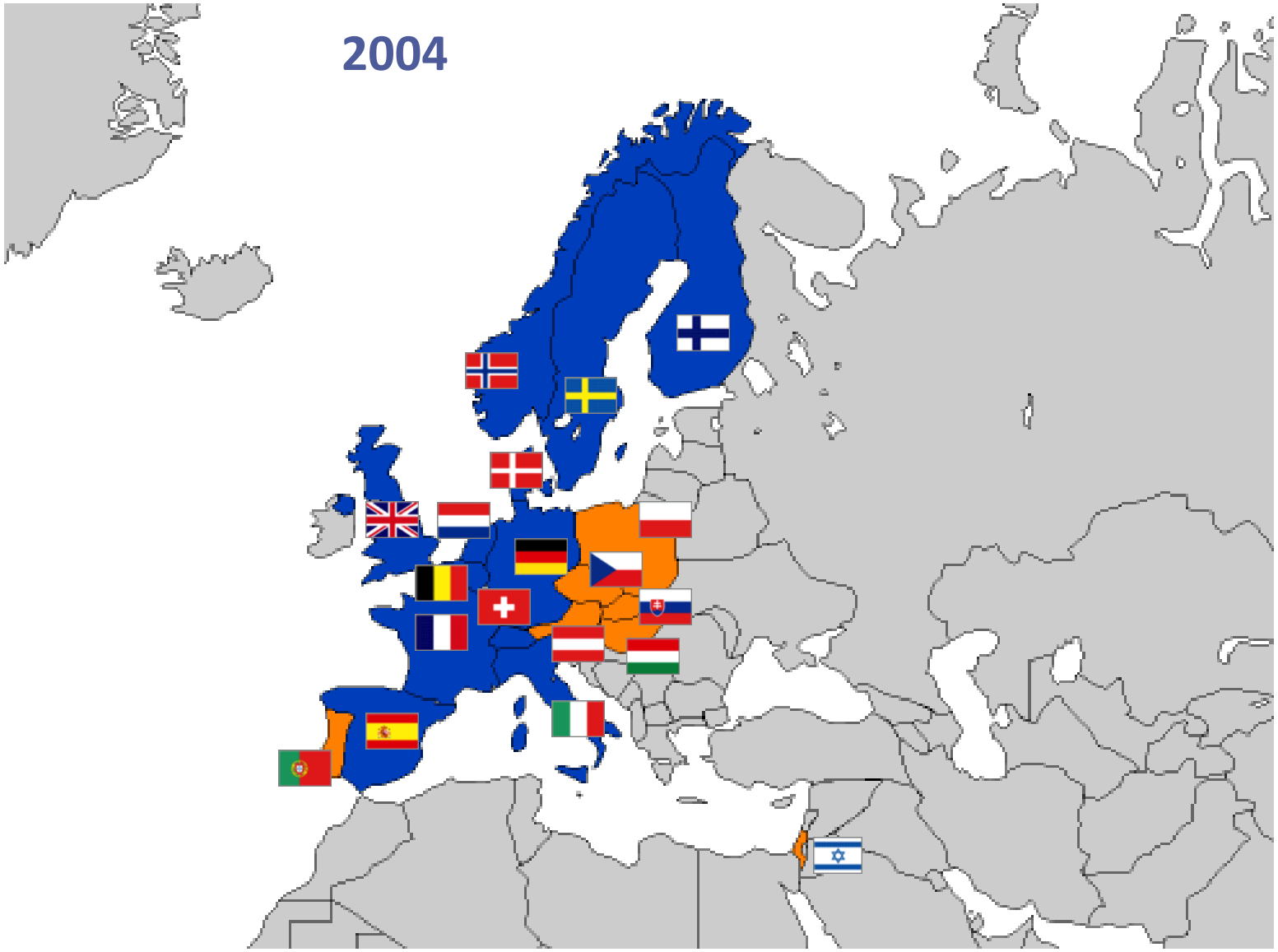
THE ESRF TODAY: FACTS AND FIGURES



THE ESRF TODAY: FACTS AND FIGURES

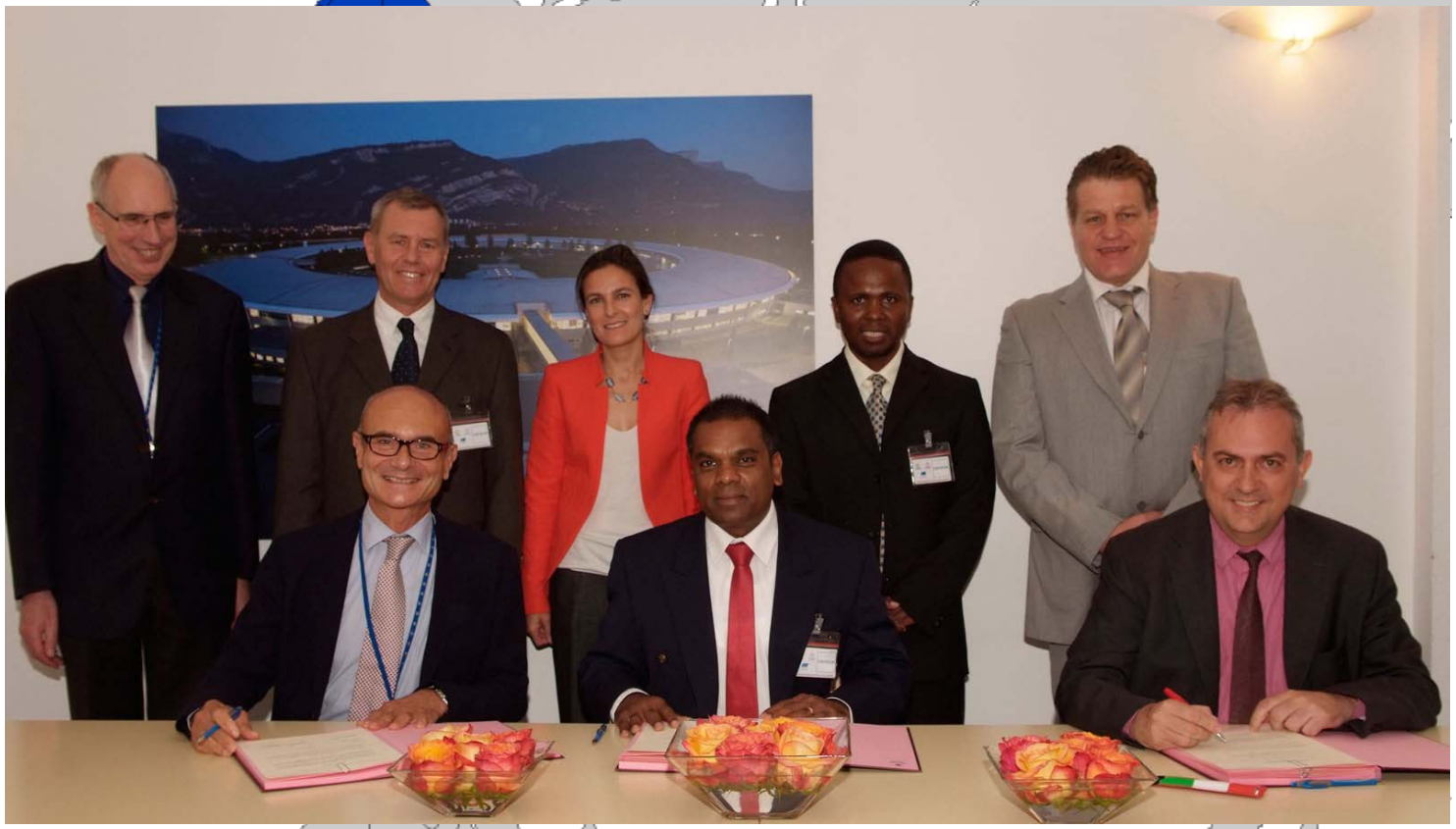


THE ESRF TODAY: FACTS AND FIGURES



THE ESRF TODAY: FACTS AND FIGURES

2013



THE ESRF TODAY: FACTS AND FIGURES

2014

THE ESRF TODAY: FACTS AND FIGURES

Members:	
France	27,5 %
Germany	24 %
Italy	13,2 %
United Kingdom	10,5 %
Russia	6 %
Benesync (Belgium, The Netherlands)	5,8 %
Nordsync (Denmark, Finland, Norway, Sweden)	5 %
Spain	4 %
Switzerland	4 %
Associates:	
Israel	1,5 %
Austria	1,3 %
Centralsync (Czech Republic, Hungary, Slovakia)	1,05%
Poland	1 %
Portugal	1 %
South Africa	0,3 %

ESRF: Members

Contracting Parties designate **Members**

France

Germany

Italy

United Kingdom

Russia

Belgium

The Netherlands

CEA

CNRS

DESY

CNR

INFN

STFC

NRC-KI

BENESYNC: SPFPPS

NORDSYNC: DASTI

MINECO

SERI

ESRF

Denmark

Finland

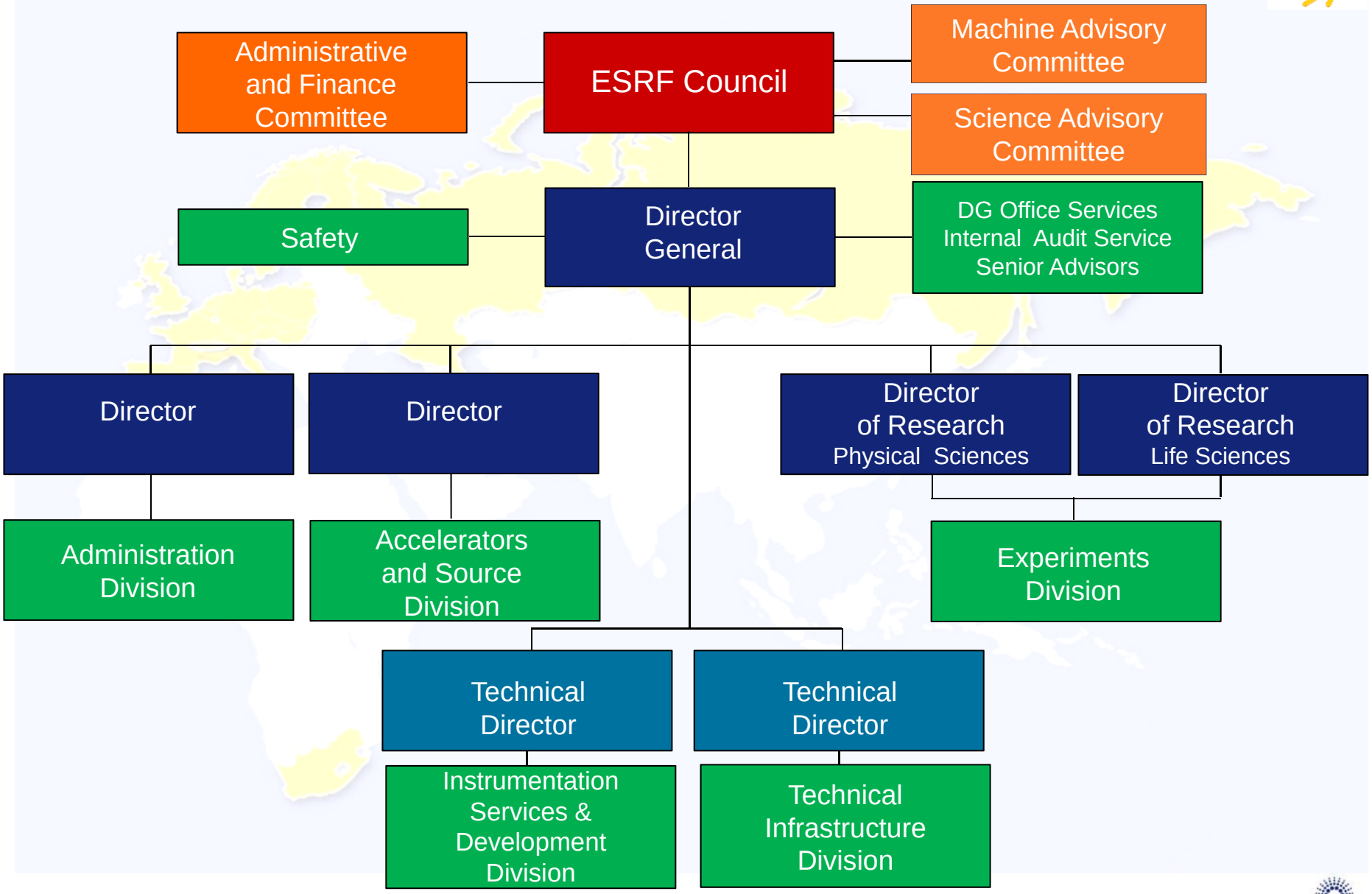
Norway

Sweden

Spain

Switzerland

ESRF GOVERNANCE



The ESRF's impact is felt in all partner countries:

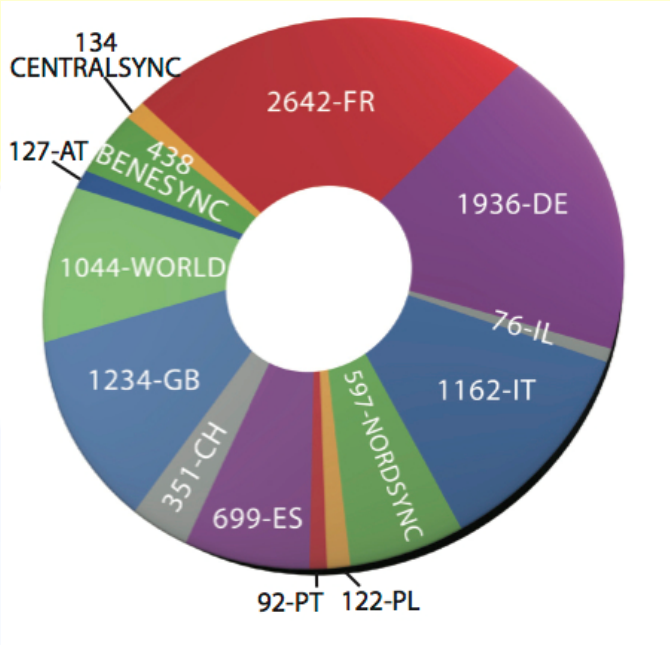
- Producing scientific excellence
- Helping improving performance in industry
- Promoting training and education
- Providing global and local economical returns

Impact on scientific community:

producing scientific excellence

The ESRF offers instrumentation for innovative experiments which enhances 'excellence' and produces knowledge in partner countries:

- **During the last 10 years, the ESRF has delivered more than 46,000 instrument-days,**
- **About 10,000 research projects have received beamtime based on scientific merit.**

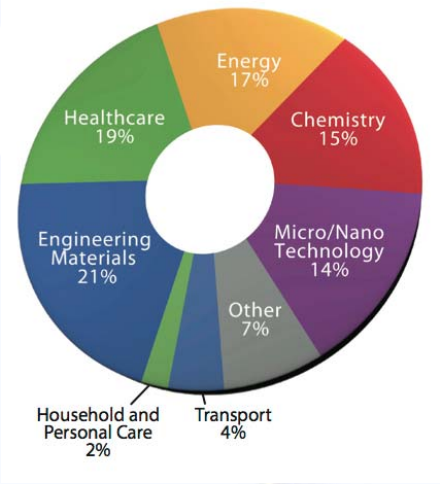


Distribution of individual successful proposers at the ESRF by country over the last 10 years.
BENESYNC: BE, NL;
CENTRALSYNC: CZ, HU, SK;
NORDSYNC: DK, FI, NO, SE.

Driving innovation:

Important industry-access programme via ESRF BDO:

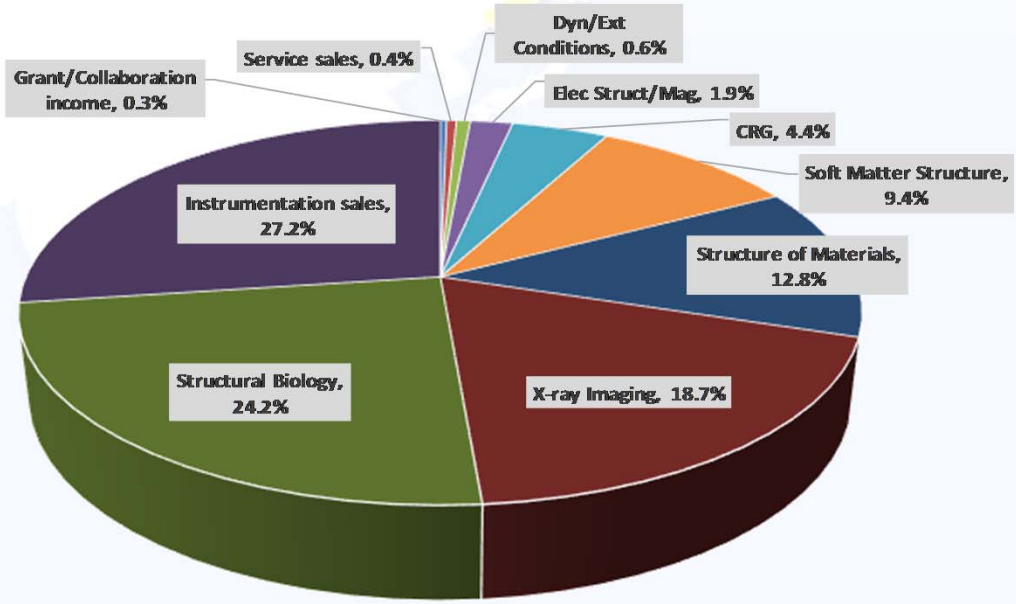
- More than 100 unique clients from industry
- Generating ~ 2M€/year



Industry sectors represented at the ESRF

Direct impact on European wealth-generation:

- An important fraction of the structural biology research is done in European national light sources for pharma sector thanks to ESRF's pioneering efforts
- Leading role in local initiatives with the micro- and nano-electronics industry



Commercial income by sector in 2014. Structural biology and X-ray imaging dominate beamtime sales.

Sharing technology and innovation:

The importance of the ESRF for industry goes beyond proprietary use.

Under its public access programme, the ESRF also drives innovation through industry-sponsored academic research.

According to a recent survey sampling ESRF users:

- **40% of respondents stated that their research has applications in industrial R&D**
- **almost 50% ESRF users have direct links with R&D centres**
- **while one third benefit from industrial funding**

Technologies generated by the ESRF are:

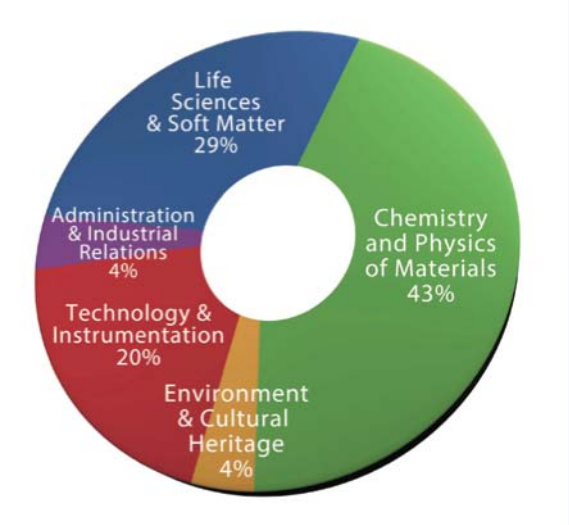
- **shared widely with other synchrotrons in member countries**
- **increasingly exploited by other research facilities and by industry**

Impact through training and education:

The ESRF attracts new generations of scientists and engineers.

- Young scientists and engineers, PhD students and post-docs represent more than 15% of the overall ESRF staff. They are trained in world-class methods in experimental science.

- During the last five years, the ESRF has welcomed more than 170 post-docs and PhD students for total budget of 31.5 M€ and 260 trainees with a total budget of 2.2 M€.



Trainees, students and post-doctoral fellows researchers at the ESRF by field of activity.

ESRF

Scientific and technical developments are strongly dependent on the sharing of expertise and costs across borders

Only joining forces has made possible what the ESRF is today and what it offers to its scientific community

THANK YOU!


Thank you for your attention
THE AFRICAN LIGHT SOURCE
CONFERENCE AND WORKSHOP
16 - 20 NOVEMBER 2015, ESRF GRENOBLE FRANCE