ESRF Facility & User Program Overview

Joanne McCarthy
Head of ESRF User Office

ESRF General Overview

Location of facility : Grenoble, France

Ground-Breaking : January 1988

First Light : February 1992 (storage ring), November 1992 (beamline)

First official User Operation : September 1994 (8 beamlines)

Staff : 619 people work at ESRF (2012)

Annual Budget :

ESRF Operation ~86 M€ (~90M€ Upgrade Programme over 2009-2015)

User Budget ~1.4 M€

(6% budget reduction 2011-2013)

ESRF General Overview

Member and associate countries (as of July 2013)

Members' share in contribution to the annual budget:

27.5%	France	
25.5%	Germany	
15%	Italy	13%
14%	United Kingdom	10%
4%	Spain	
4%	Switzerland	
6%	Benesync (Belgium, The Netherlands)	
4%	Nordsync (Denmark, Finland, Norway, Sweden)	

Additional contributions
(percentages refer to Members' total contribution):

1.3%	Austria
1%	Portugal
1%	Israel
1%	Poland
1.05%	Centralsync (Czech Republic, Hungary, Slovakia)
0.3%	South Africa – April 2013

Council Mandate : 30 public beamlines

1988 Ground Breaking

1994 First user operation — **8 public 3 CRG**

1998 BL construction complete — **30 public 12 CRG**

2004 Maximum # of BLs — **31.5 public 11 CRG**

2013 6% budget reduction — **29.5 public 9 CRG**

SOURCE POSITION	NUMBER OF INDEPENDENT END-STATIONS	BEAMLINE NAME	STATUS
ID01	1	Microdiffraction imaging	Operational since 07/97
ID02	1	High brilliance	Operational since 09/94
ID03	1	Surface diffraction	Operational since 09/94
ID08	1	Dragon	Operational since 02/00
ID09	1	White beam	Operational since 09/94
ID10	1	Soft interfaces and coherent scattering	Operational from 06/12
ID11	1	Materials science	Operational since 09/94
ID12	1	Circular polarisation	Operational since 01/95
ID13	1	Microfocus	Operational since 09/94
ID14A	1	Protein crystallography EH 1	Operational since 07/99
		Protein crystallography EH 2	Operational since 12/97
ID14B	1	Protein solution small-angle scattering EH 3	Operational since 12/98
		Protein crystallography EH 4	Operational since 07/99
ID15A	1	High energy diffraction	Operational since 09/94
ID15B	1	High energy inelastic scattering	Operational since 09/94
ID17	1	Medical	Operational since 05/97
ID18	1	Nuclear scattering	Operational since 01/96
ID19	1	Topography and tomography	Operational since 06/96
ID21	1	X-ray microscopy	Operational since 12/97
ID22	1	Microfluorescence	Operational since 12/97
ID23	2	Macromolecular crystallography MAD	Operational since 06/04
		Macromolecular crystallography microfocus	Operational since 09/05
ID24	1	Dispersive EXAFS	Operational since 02/96
ID26	1	X-ray absorption and emission	Operational since 11/97
ID27	1	High pressure	Operational since 02/05
ID28	1	Inelastic scattering II	Operational since 12/98
ID29	1	Multiwavelength anomalous diffraction	Operational since 01/00
ID31	1	Powder diffraction	Operational since 05/96
BM14	1	Macromolecular crystallography (MAD)	Operational since 01/10
BM23	1	X-ray absorption spectroscopy	Operational since 03/11
BM29	1	Bio SAXS	Operational since 06/12

SOURCE POSITION	NUMBER OF INDEPENDENT END-STATIONS	BEAMLINE NAME	FIELD OF RESEARCH	STATUS
BM01	2	Swiss-Norwegian BL	X-ray absorption & diffraction	Operational since 01/95
BM02	1	D2AM (French)	Materials science	Operational since 09/94
BM08	1	Gilda (Italian)	X-ray absorption & diffraction	Operational since 09/94
BM20	1	ROBL (German)	Radiochemistry & ion beam physics	Operational since 09/98
BM25	2	SPLINE (Spanish)	X-ray absorption & diffraction	Operational since 04/05
BM26	2	DUBBLE (Dutch/Belgian)	Small-angle scattering	Operational since 12/98
			EXAFS	Operational since 06/01
BM28	1	XMAS (British)	Magnetic scattering	Operational since 04/98
BM30	2	FIP (French)	Protein crystallography	Operational since 02/99
		FAME (French)	EXAFS	Operational since 08/02
BM32	1	IF (French)	Interfaces	Operational since 09/94

Table 7: List of the Collaborating Research Group beamlines.

Beamlines at ESRF

Council Mandate : 30 public beamlines

1988 Ground Breaking

1994 First user operation — **8 public, 3 CRG**

1999 BL construction complete — **30 public, 12 CRG**

2004 Maximum # of BLs — **31.5 public, 11 CRG**

2013 6% budget reduction — **29.5 public, 9 CRG**

Number of available beamlines reduced significantly since beginning of Upgrade Programme (2010)

Of these **34 independent end-stations** **8** are **currently unavailable** due to the **Upgrade Programme**

29.5 public beamlines corresponds to

34 Independent End-stations

ESRF Upgrade Programme

Renew beamline portfolio of the ESRF with

minimum interruption of continued operation during the upgrade

Phase I (2009-2015)

- Construction of Experimental Hall Extension, EX2 (completed June 2013)
  - General shutdown from 5th December 2011 to 4th May 2012 (5 months)

- 3 classes of beamlines
  - UPBL beamlines: 8 UPBL projects, 15 independent endstations
  - Moving beamlines: 2 fully reburbished + 2 moving I.Es
  - Non-moving beamlines: 15 I.Es

- 2013 busiest year for beamlines; 8 I.Es currently unavailable

UP Phase I - Construction

UP Phase I - Construction

UP Phase I - Beamlines

Beamline Number	Original Beamline Name	Closure Date	Last Proposal Round	Last Scheduling Period	New Beamline Name	Opening Date	First Proposal Round	First Scheduling Period
ID01	Anomalous scattering Beamline	December 2013	Apr. 2013	2013/II		November 2014 tbc	Apr. 2014	2014/II
ID02	High Brilliance Beamline - SAXS/WAXS/USAXS/Time-Resolved	July 2013	Oct. 2012	2013/I	High Brilliance Beamline	April 2014 tbc	Oct. 2013	2014/I
ID03	Surface Diffraction Beamline							
BM05	X-ray Imaging Beamline	April 2011	Oct. 2010	2011/I	*Definitive closure as public beamline*			
ID06	*Not public beamline*				*Not public beamline following ID20 closure*			
ID06-LVP	*Not public beamline*				Large Volume Press Beamline	September 2012	Apr. 2012	2012/II
ID08	Soft X-ray Spectroscopy Beamline	October 2013	Oct. 2012	2013/I				
ID09A	White Beam Station - High Pressure Beamline							
ID09B	White Beam Station - Time-resolved Beamline							
ID10A	Troika I and III Beamline	December 2011	Apr. 2011	2011/II	Becomes ID10	May 2012	Oct. 2011	2012/I
ID10C	Troika I and III Beamline	December 2011	Apr. 2011	2011/II	*Definitive closure; Merged into ID10*			
ID10B	Troika II Beamline	December 2011	Apr. 2011	2011/II	*Definitive closure; Merged into ID10*			
ID11	Materials Science Beamline							
ID12	Circular Polarisation Beamline							
ID13	Microfocus Beamline							
ID14-1	Structural Biology Beamline	November 2012	April 2012	2012/II				
ID14-2	Structural Biology Beamline	April 2010	April 2009	2009/II				
ID14-3	Bio-SAXS Beamline	December 2011	Rolling	2011/II				
ID14-4	Structural Biology Beamline		Apr. 2013	2013/II				
ID15A	High Energy Diffraction and Scattering Beamline							
ID15B	High Energy Diffraction and Scattering Beamline							
ID16A	ID16 - Inelastic X-ray Scattering Beamline	December 2011	Apr. 2011	2011/II	Nano-Imaging (ID16A) and Nano-Analysis (ID16B) (NiNa) Beamline	March 2014	Oct. 2013	2014/I
ID16B						January 2014	Apr. 2013	2013/II
ID17	Bio-medical Beamline							
ID18	Nuclear Resonance Beamline							
ID22N	Nuclear Resonance End-Station	1st March 2011	Apr. 2010	2010/II	*Definitive Closure*			
ID19	High-Resolution Diffraction Topography Beamline							
ID20	Magnetic Scattering Beamline	May 2011	Apr. 2010	2010/II	Inelastic X-ray Scattering Beamline	May 2013	Oct. 2012	2013/I
ID21	X-ray Microscopy Beamline							
ID22	Micro-Fluorescence, Imaging & Diffraction Beamline	April 2013	Apr. 2012	2012/II	High-Resolution Powder-diffraction Beamline	April 2014	Oct. 2013	2014/I
ID18F	Microanalysis End-Station	1st March 2011	Apr. 2010	2010/II	*Definitive Closure*			
ID23-1	Structural Biology Beamline							
ID23-2	Structural Biology Beamline							
BM23	*Not public beamline*				X-ray Absorption Spectroscopy Beamline	March 2011	Oct. 2010	2011/I
ID24	Dispersive EXAFS Beamline	28th July 2010	Oct. 2009	2010/I	Dispersive EXAFS Beamline	May 2012	Oct. 2011	2012/I
ID26	X-Ray Absorption & Emission Spectroscopy Beamline							
ID27	High Pressure Beamline							
ID28	Inelastic Scattering II Beamline							
ID29	Structural Biology Beamline							
BM29	X-ray Absorption Spectroscopy Beamline	26th May 2010	Oct. 2009	2010/I	Bio-SAXS Beamline	June 2012	Rolling	2012/I
ID30A	*Not public beamline*				MASSIF Beamline - Screening Stations A-1, A-2, A-3	November 2013 tbc	Apr.2013	2013/II
ID30B	*Not public beamline*				MASSIF Beamline - MAD Station B	???		
ID31	High-Resolution Powder-diffraction Beamline	December 2013	Apr. 2013	2013/II				
ID32	Surface XRD, SEXAFS and X-ray Standing Waves	December 2011	Apr. 2011	2011/II	Soft X-ray Spectroscopy Beamline	March 2014 tbc	Oct. 2013	2014/I
BM01A	Swiss-Norwegian CRG Beamline : Diffraction							
BM01B	Swiss-Norwegian CRG Beamline : XAS and HRPD							
BM02	D2AM French CRG Beamline							
BM08	X-ray Diffraction and Absorption Beamline							
BM14	CRG MX Beamline		Apr. 2009	2009/II	ESRF/EMBL/INDIA MX Beamline		Oct. 2009	2010/I
BM16	Macromolecular Crystallography & SAXS/WAXS	December 2011	Oct. 2010	2011/I	*Closed as Spanish CRG end of 2011; decommissioned from Summer 2011*			
BM20	The Rossendorf CRG Beamline							
BM25A	Absorption & Diffraction CRG Beamline							
BM25B	Absorption & Diffraction CRG Beamline							
BM26A	DUBBLE - Dutch-Belgian CRG Beamline : EXAFS							
BM26B	DUBBLE - Dutch-Belgian CRG Beamline : SAXS/WAXS							
BM30A	French Beamline for Investigation of Proteins							
BM30B	Absorption Spectroscopy French CRG Beamline							
BM32	Surfaces & Interfaces French CRG Beamline							

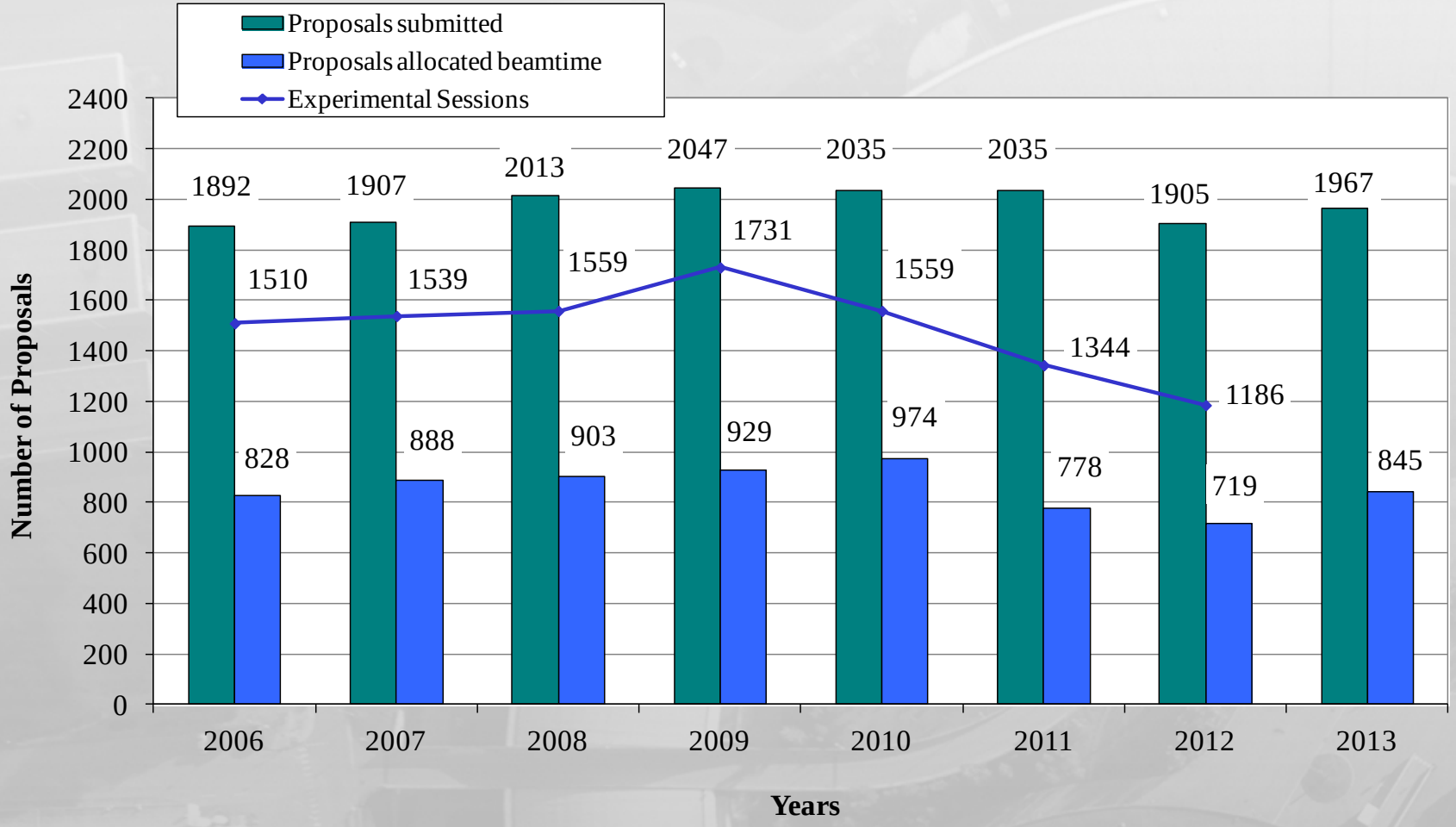
ESRF Upgrade Programme

Phase II : 2015 - 2020

- 2013 : Technical Design Study report in preparation in collaboration with user community, SAC and APAC
- Storage ring replacement
  - reduce horizontal emittance to ≥100pm
  - would mean 1 year shutdown in 2018-2019
- 4 new upgrade beamlines
- Vercors extension for up to 5 long beamlines

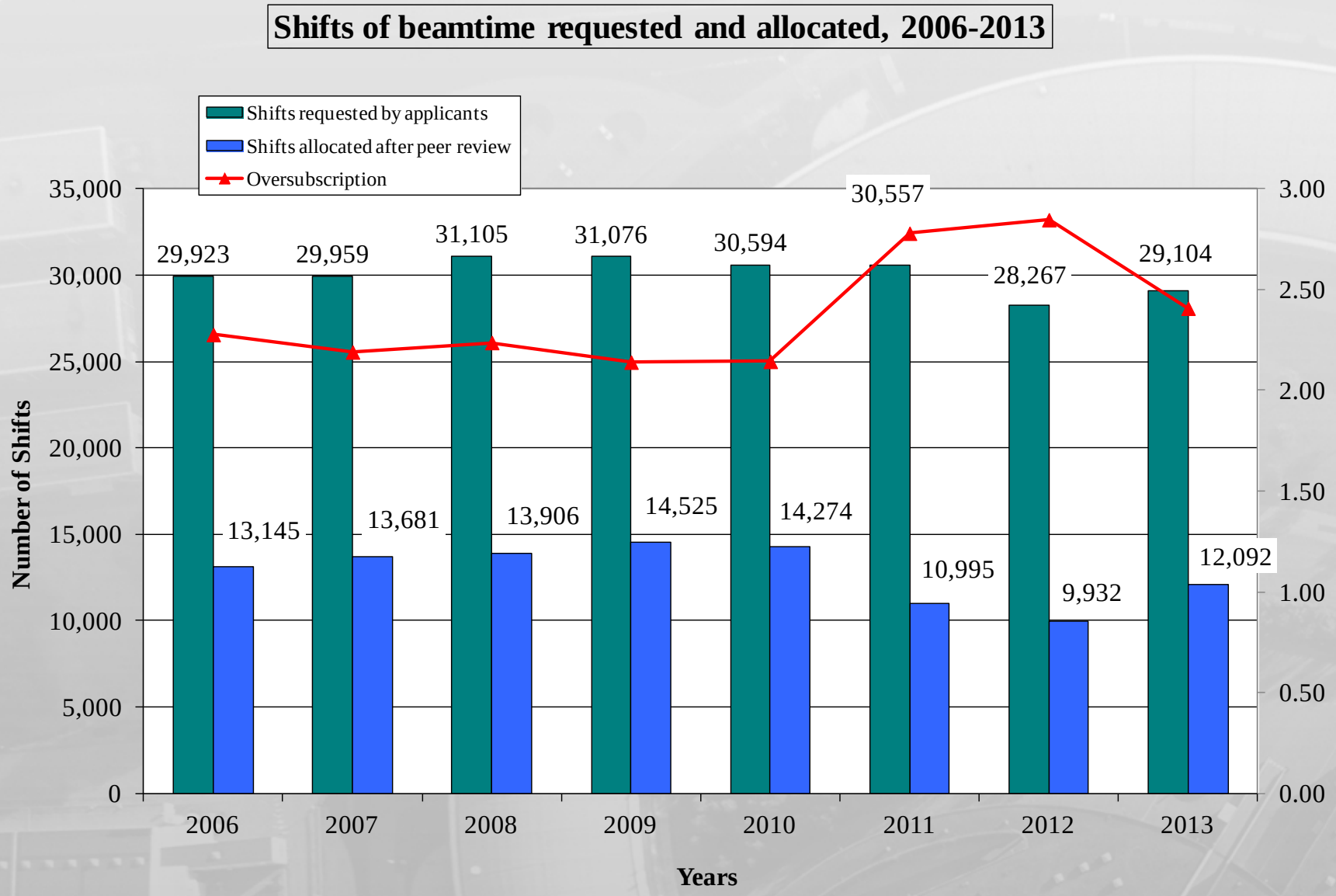
Updated Statistics

Proposals submitted and allocated beamtime, 2006-2013



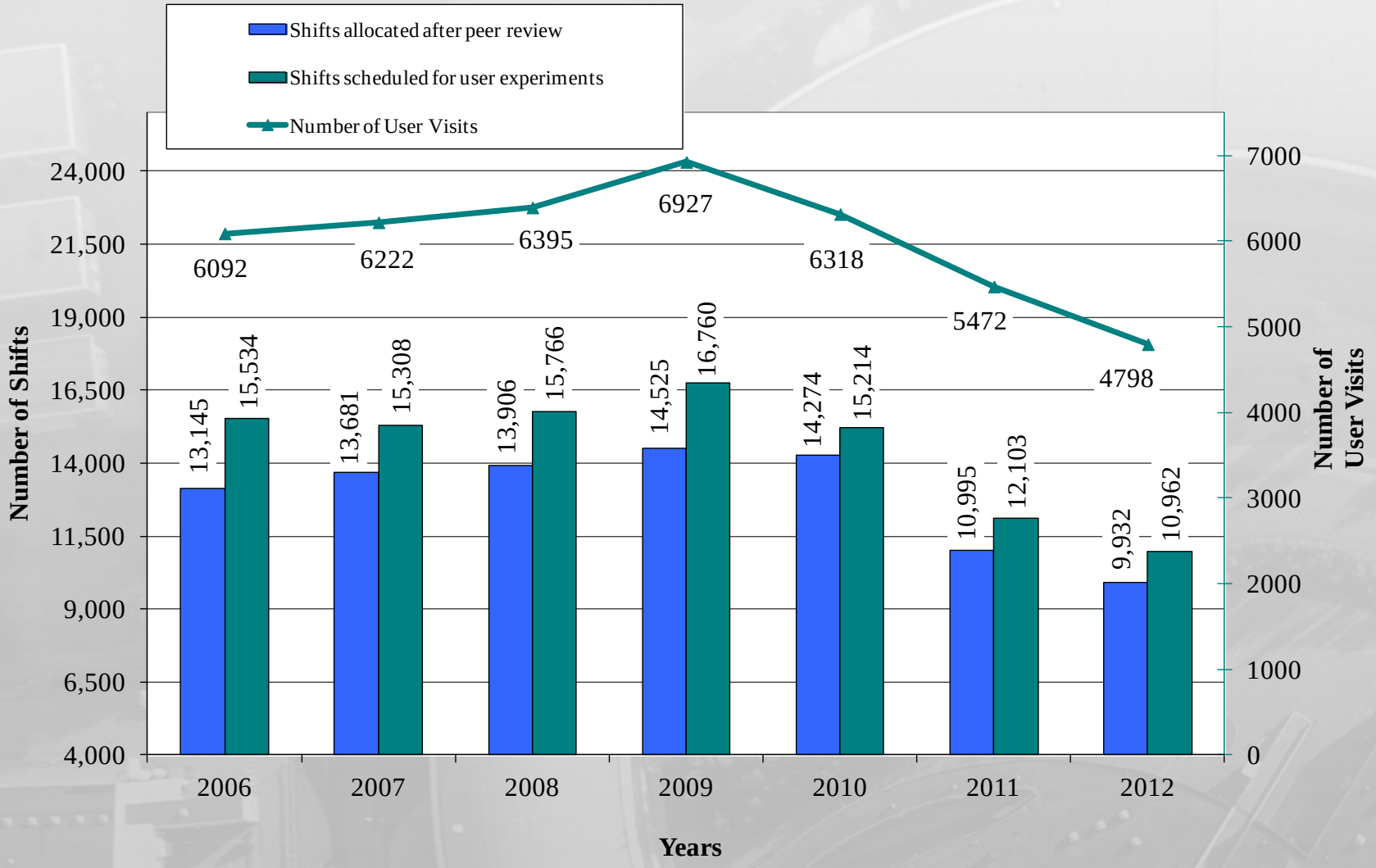
- 2011 & 2012 : ESRF General Shutdown + start of UP beamline work
- 2013 : Popular beamlines unavailable due to UP, e.g. ID22, ID02, ID08, some MX beamlines…

Updated Statistics



Updated Statistics

Shifts allocated and delivered for experiments, User visits, 2006-2012



ESRF User Community

2013 : NEW PROPOSAL REVIEW STRUCTURE !!

CH - Chemistry

ES - Earth Sciences

EV - Environment

HC - Hard Condensed Matter

HG - Cultural Heritage

LS - Life Sciences

MA - Applied Materials

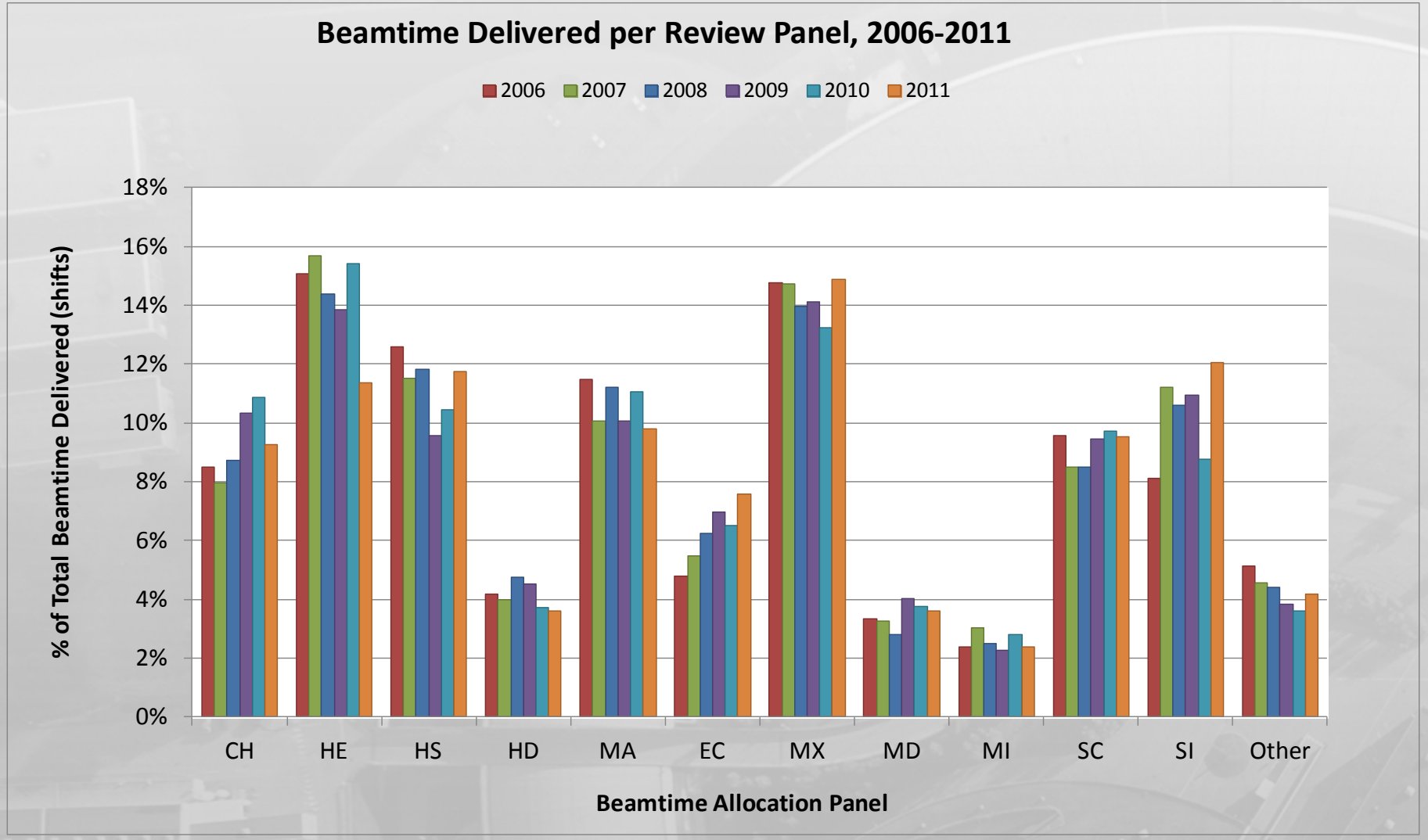
MD - Medicine

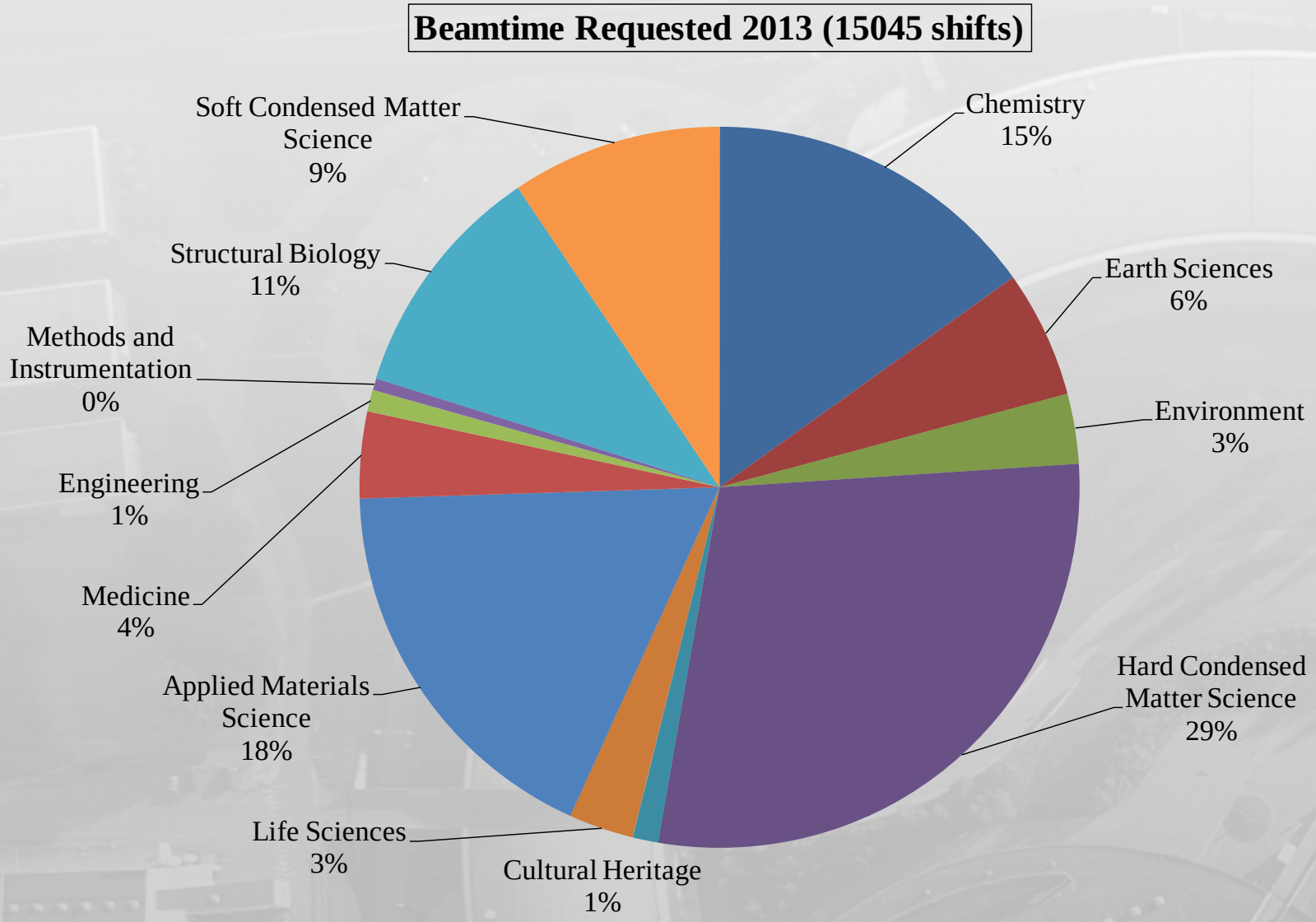
ME - Engineering

MI - Methods and Instrumentation

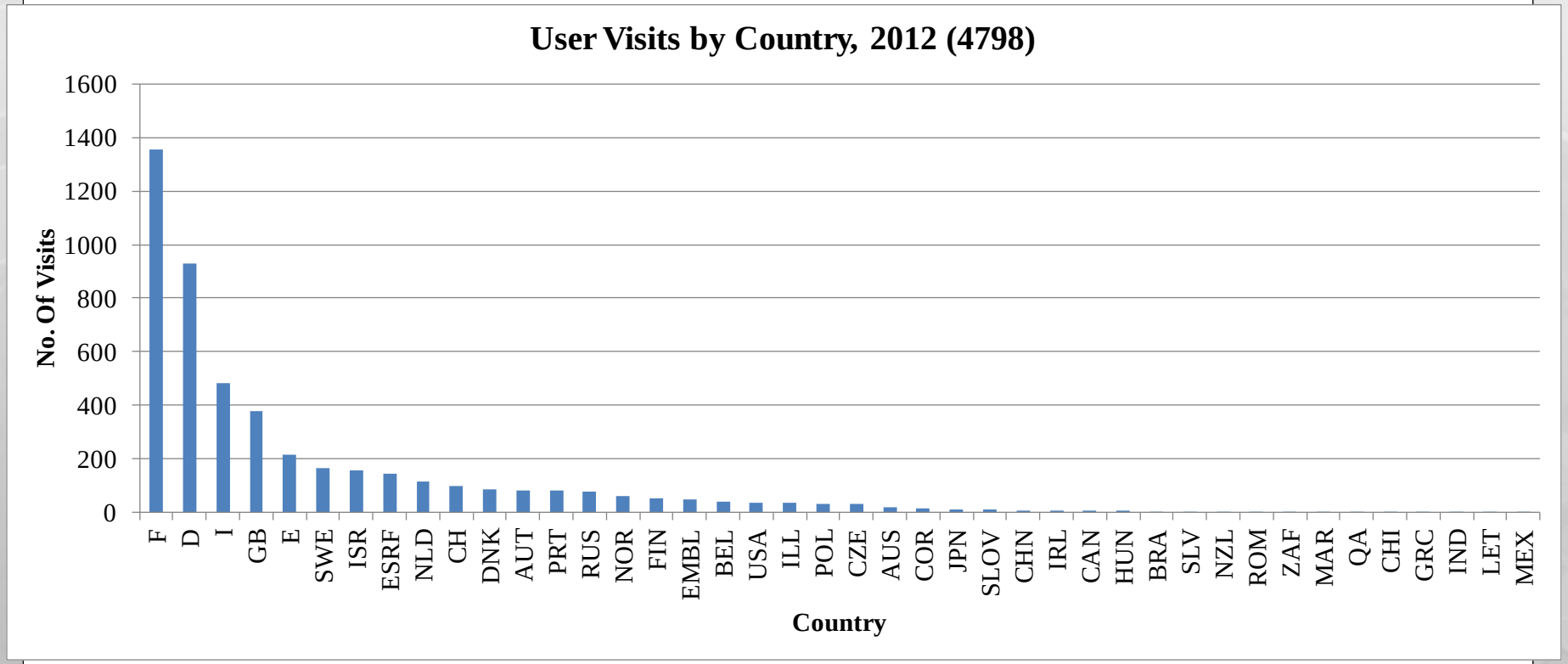
MX - Structural Biology

SC - Soft Condensed Matter


Beamtime Delivered per Review Panel, 2006-2011
2006
2007
2008
2009
2010
2011
% of Total Beamtime Delivered (shifts)
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
CH
HE
HS
HD
MA
EC
MX
MD
MI
SC
SI
Other
Beamtime Allocation Panel


Beamtime Requested 2013 (15045 shifts)
Soft Condensed Matter Science 9%
Chemistry 15%
Structural Biology 11%
Earth Sciences 6%
Methods and Instrumentation 0%
Environment 3%
Engineering 1%
Medicine 4%
Applied Materials Science 18%
Hard Condensed Matter Science 29%
Life Sciences 3%
Cultural Heritage 1%

ESRF User Community



Categories of Proposals and Users

Collaborating Research Group (CRG) Proposals

CRG Office

1 Head of Service
2.5 administrative staff
Deals with ALL admin areas of CRG operation

Public peer-reviewed proposals

User Office

1 Head of Service
2.3 administrative staff

Proprietary Research Proposals

BDO

~4 full time equivalents
(1 administrative staff)

Public Beamtime

REVIEWED PROPOSALS

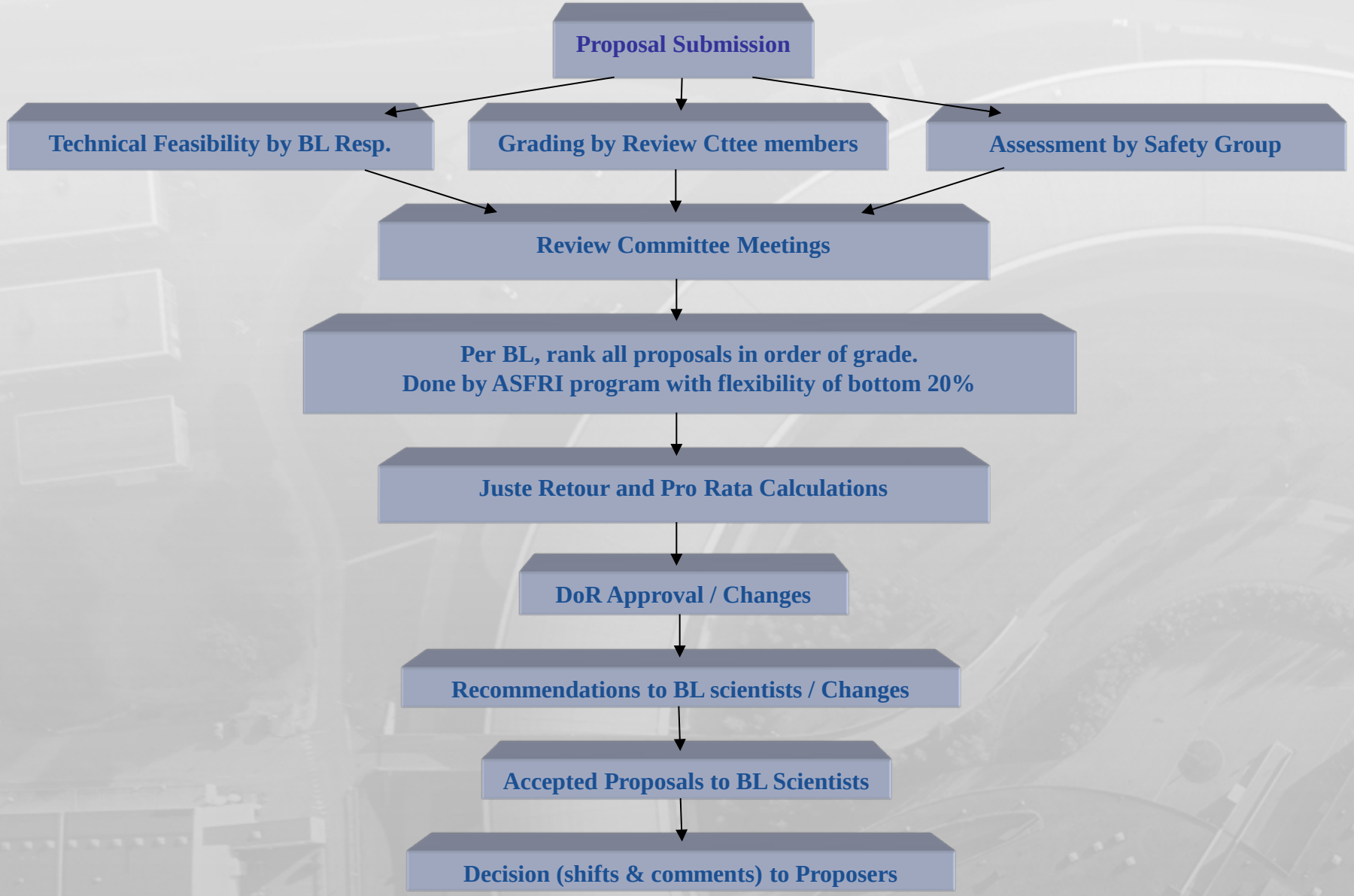
STANDARD Research Proposals

LONG TERM PROJECT Proposals

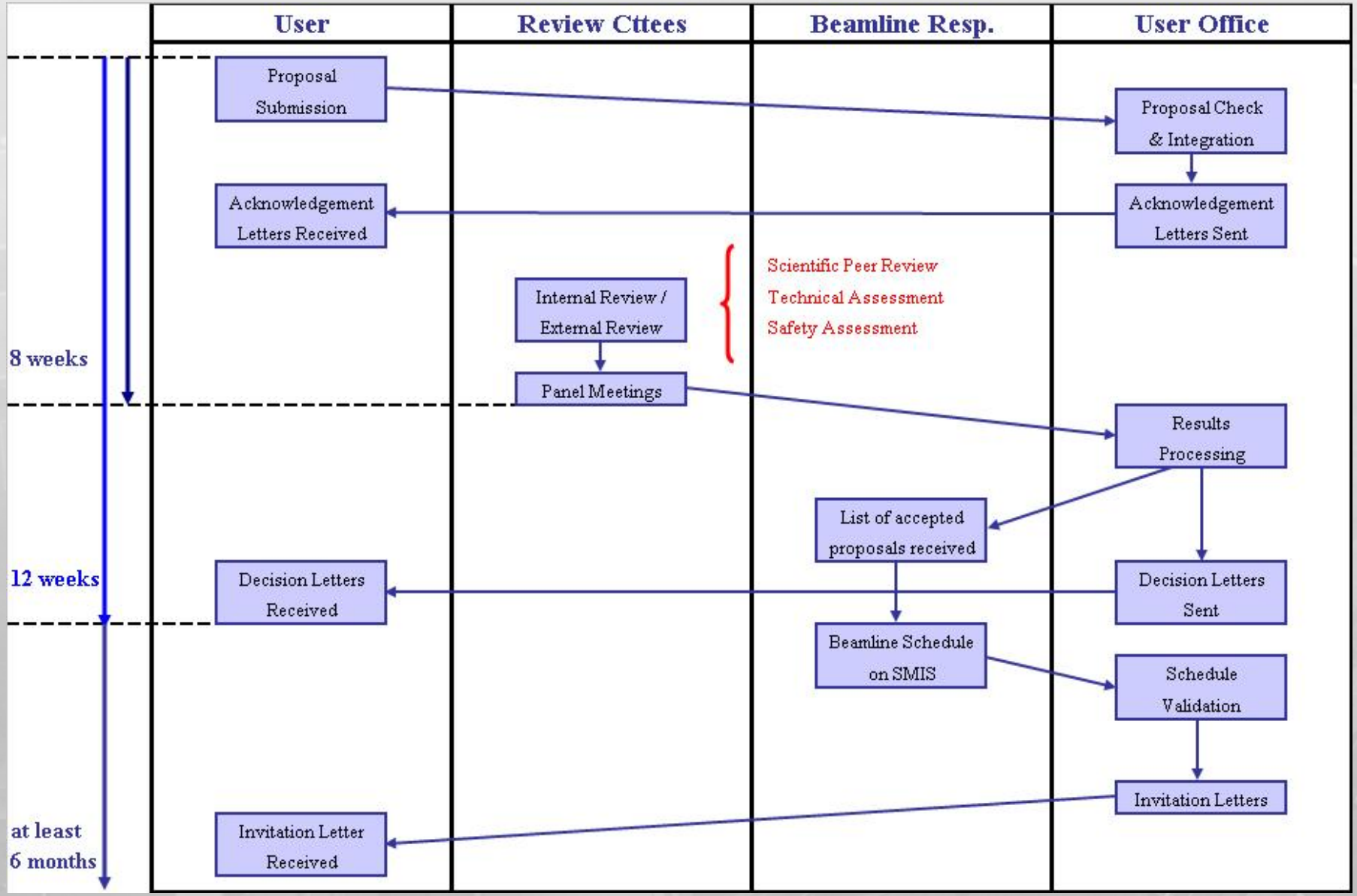
MX BAG Proposals

MX Rolling Proposals

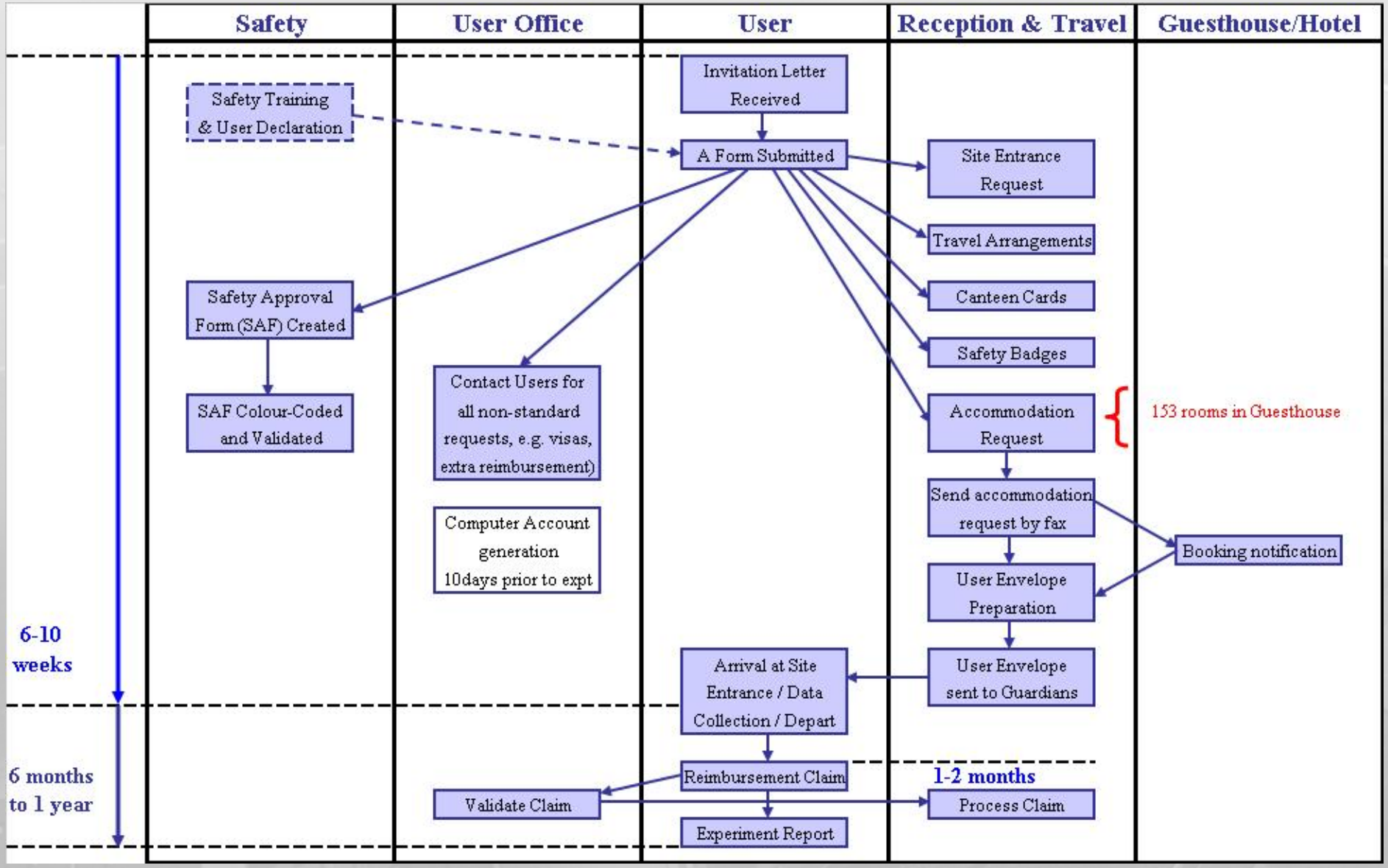
Proposal Review Process



Beamtime Application & Proposal Review



Experiment Organisation



User Registration
Proposal submission
Publication references
Feasibility comments
Grading
Review Committees
Proposal acceptance
Scheduling
Invitation letters
A Form
Safety training
Sample sheets
Safety evaluation
User accommodations
Travel arrangements
EXPERIMENT
Report submission

Proposal Workflow

- The typical workflow from user registration and proposal submission, through review process and scheduling until report submission

- Each major task is supported by the SMIS User Portal

User Registration

User

User Office

- Proposal submission
- Publication reference
- Feasibility comments
- Grading
- Review Committees
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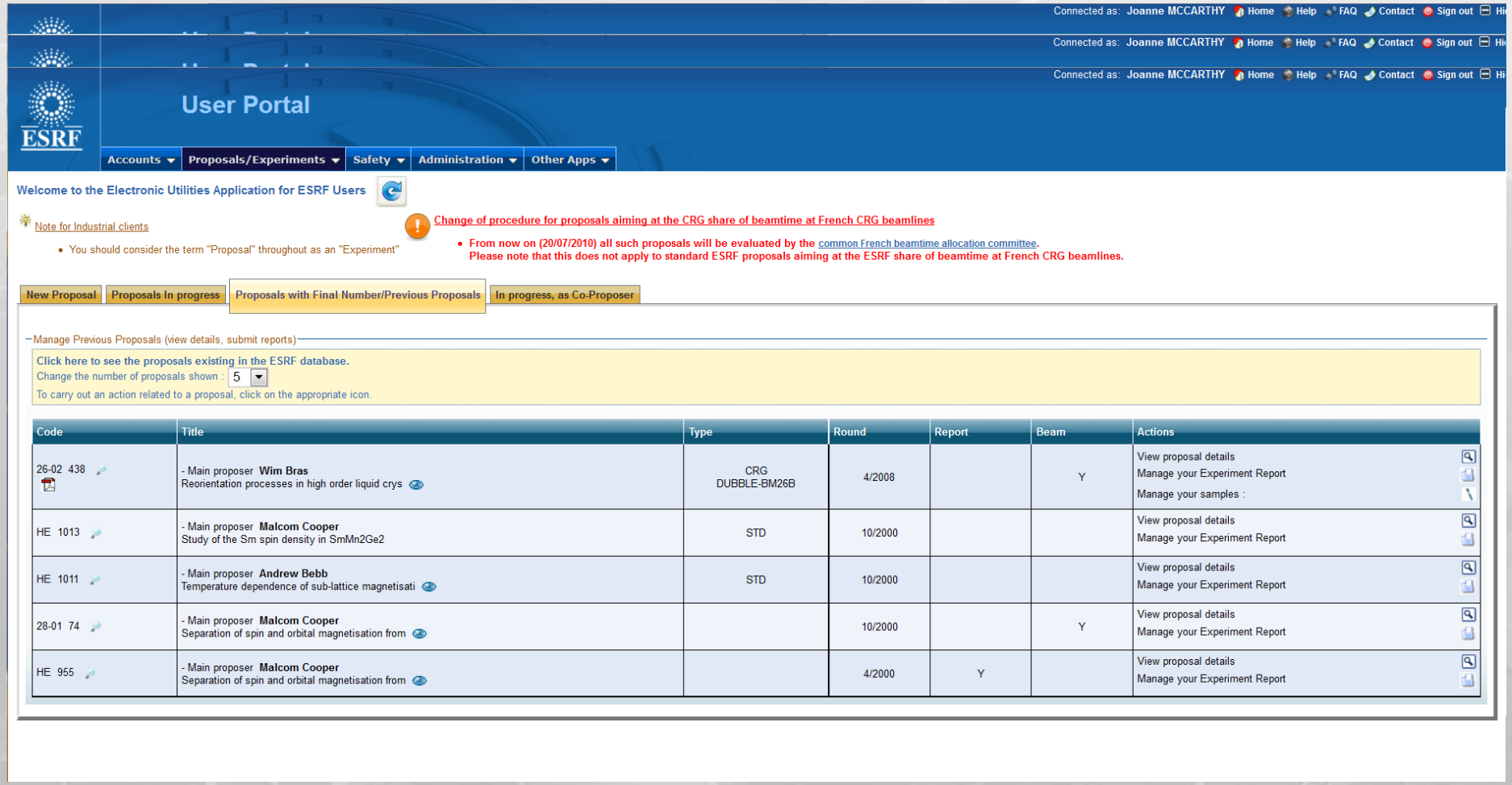
- Report submission

User Registration

Proposal submission

Main Proposer



Report submission

- User Registration
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- **Scheduling**
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Beamline Responsible

User Registration

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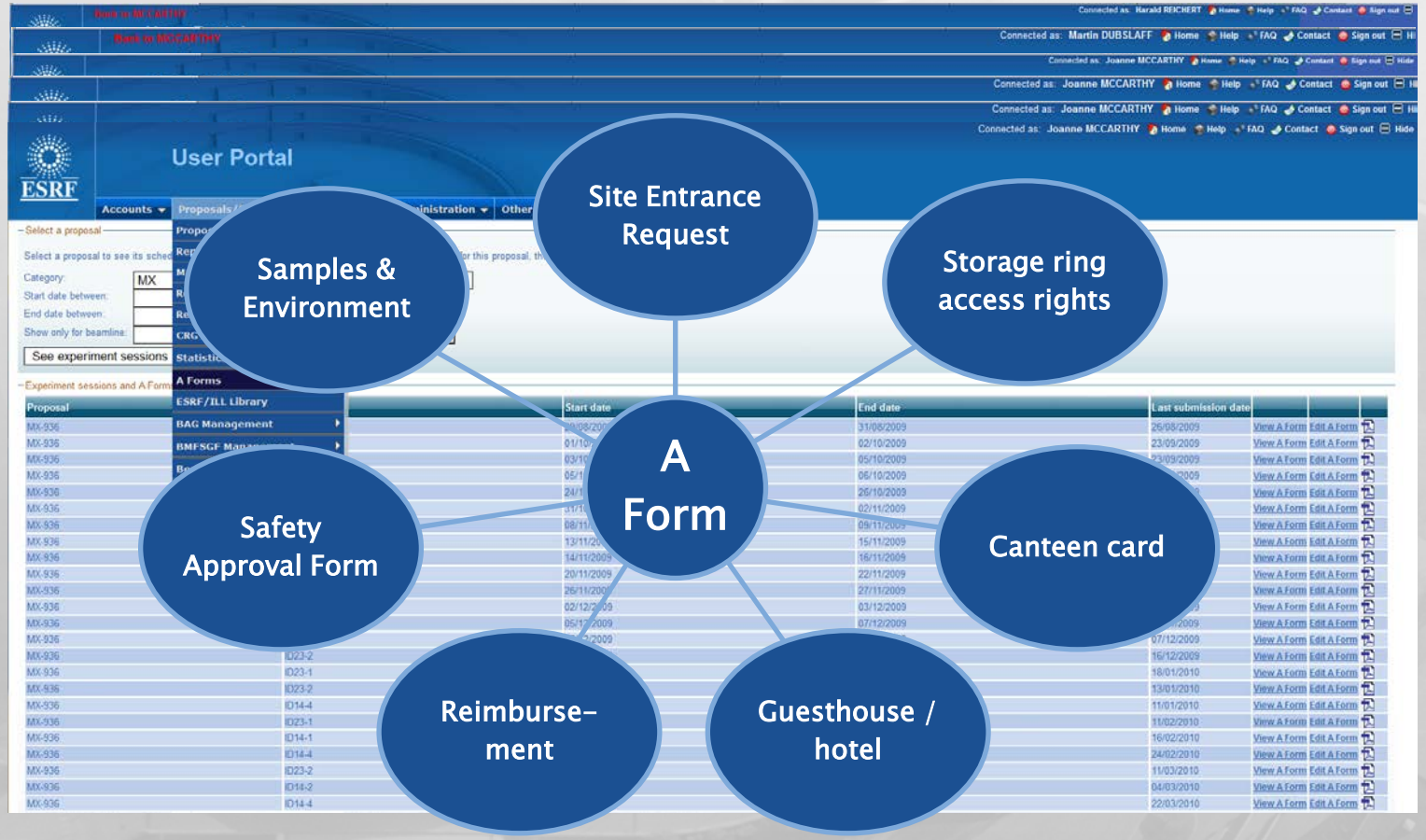

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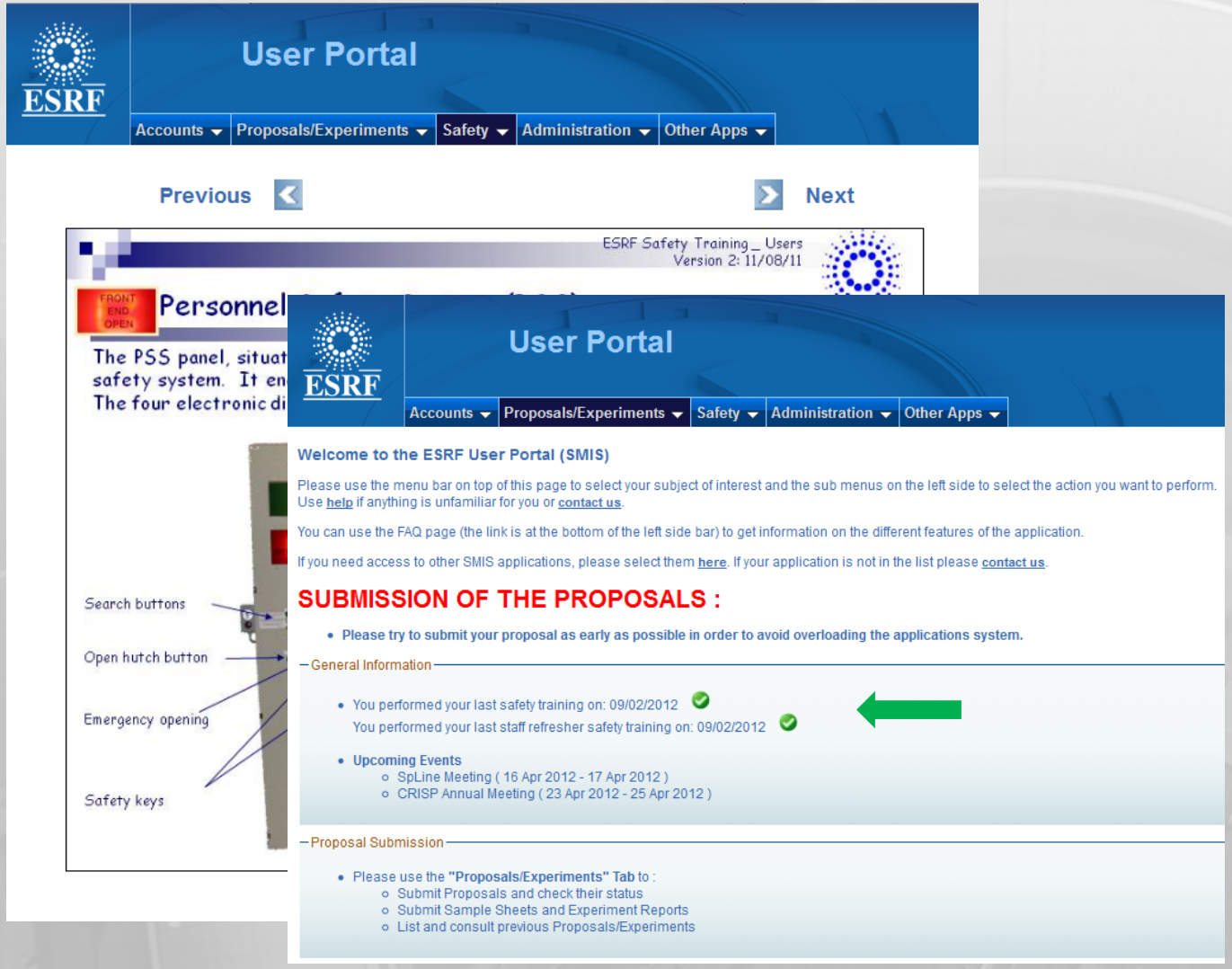

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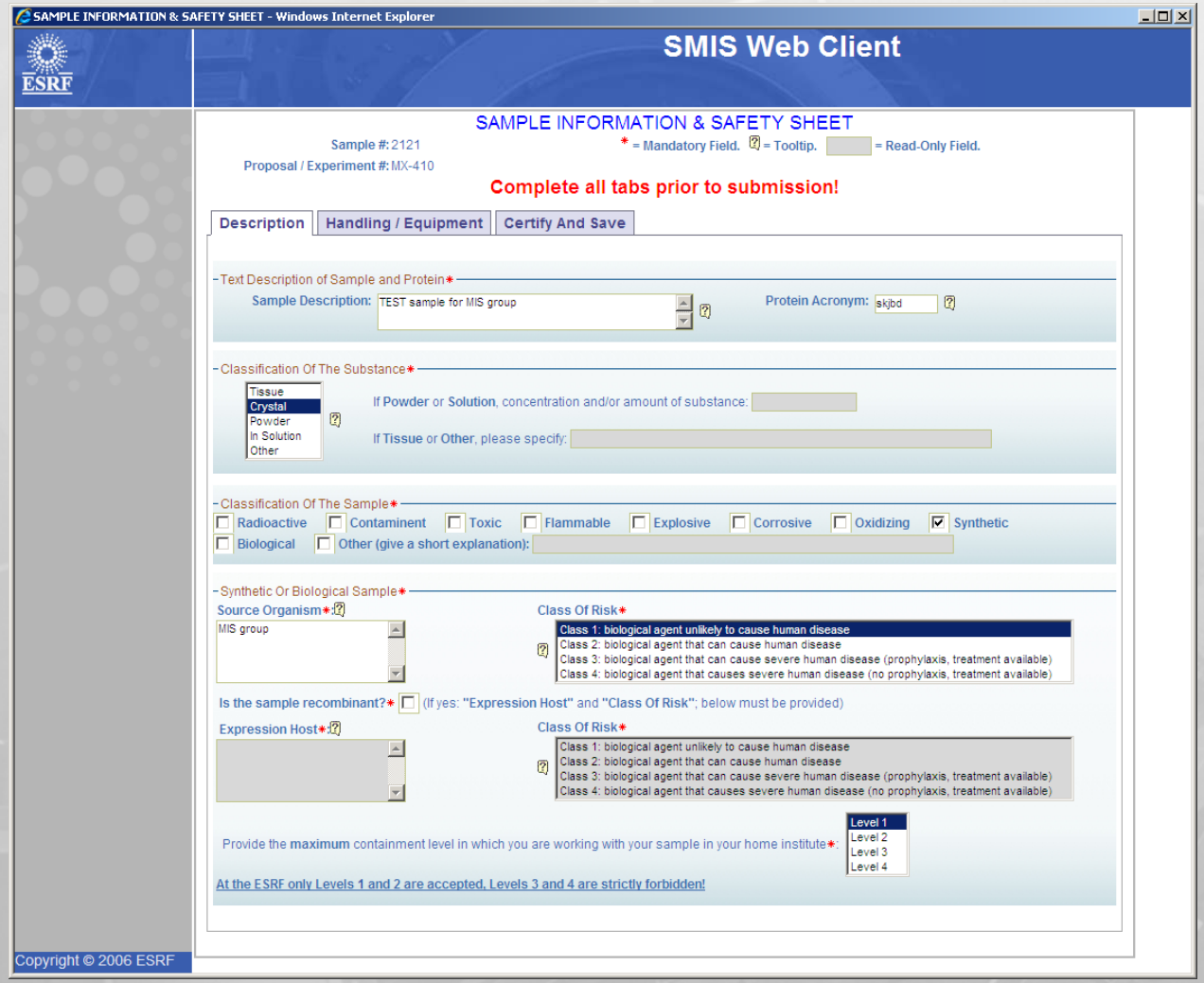

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- **Safety evaluation**
- User accommodations
- Travel arrangements
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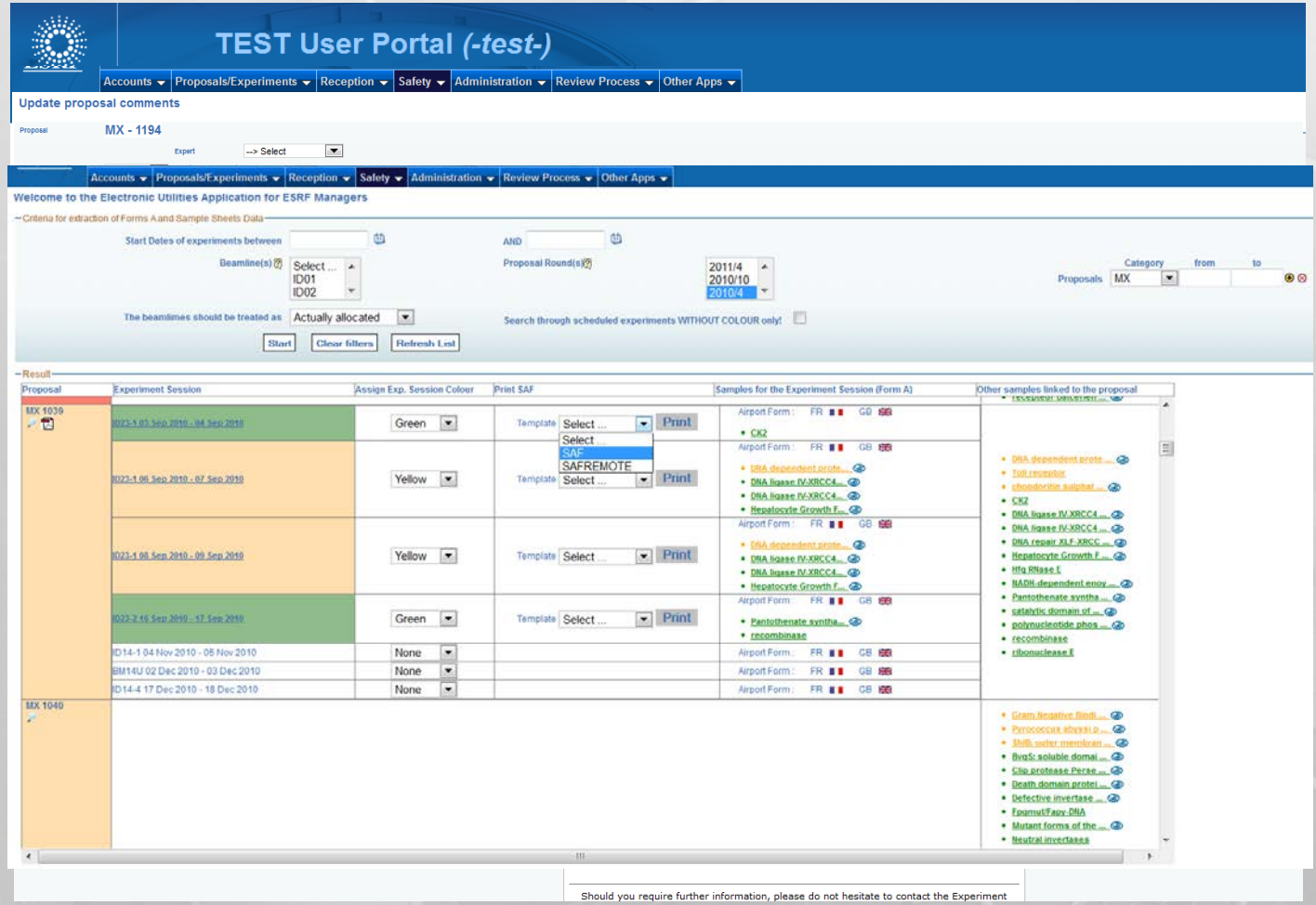
- Report submission

Proposal
Proposal and experiment session
Experiment session

Safety Officer



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Sample sheets

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EXPERIMENT

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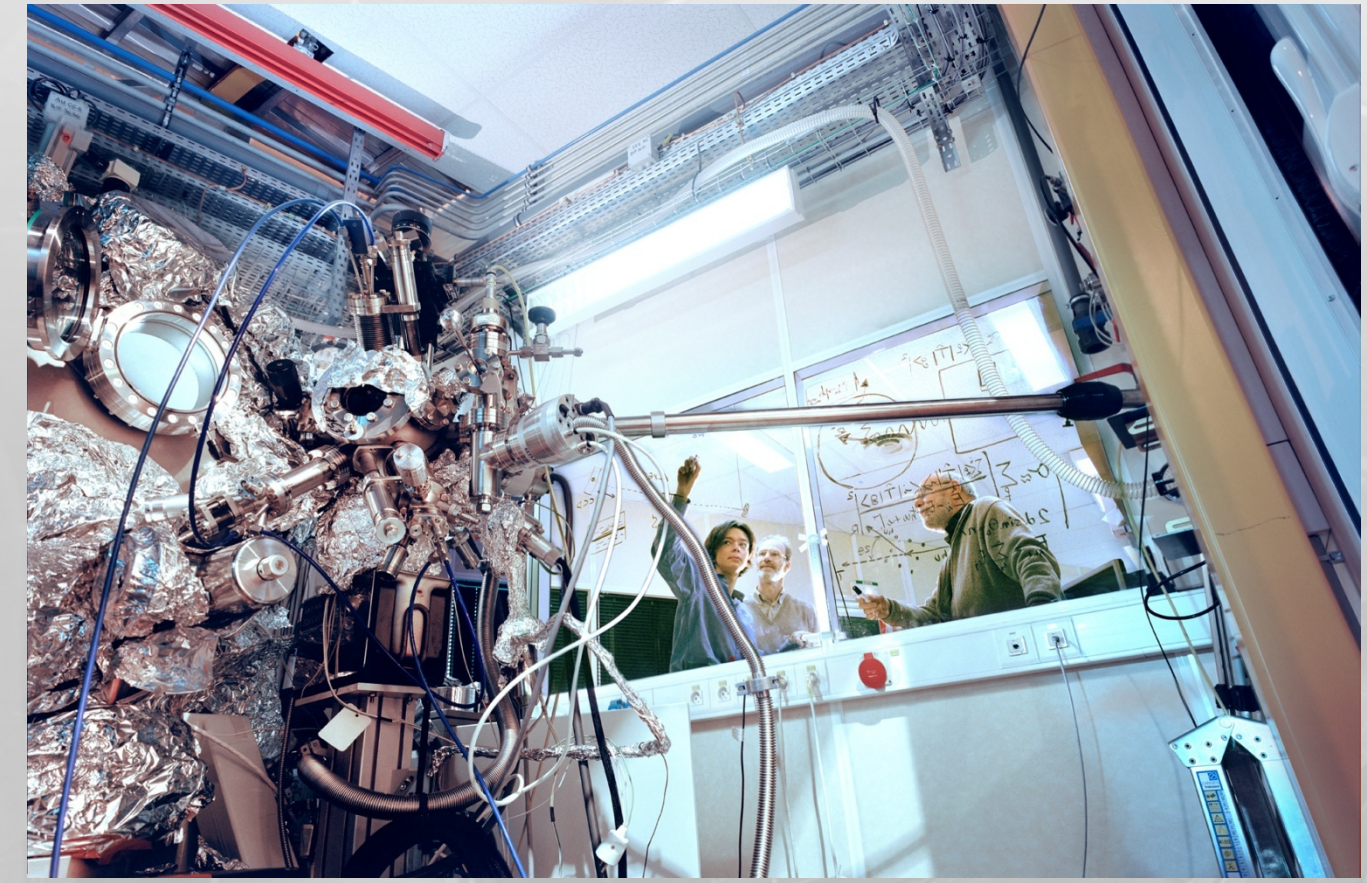
Finally: The Experiment!



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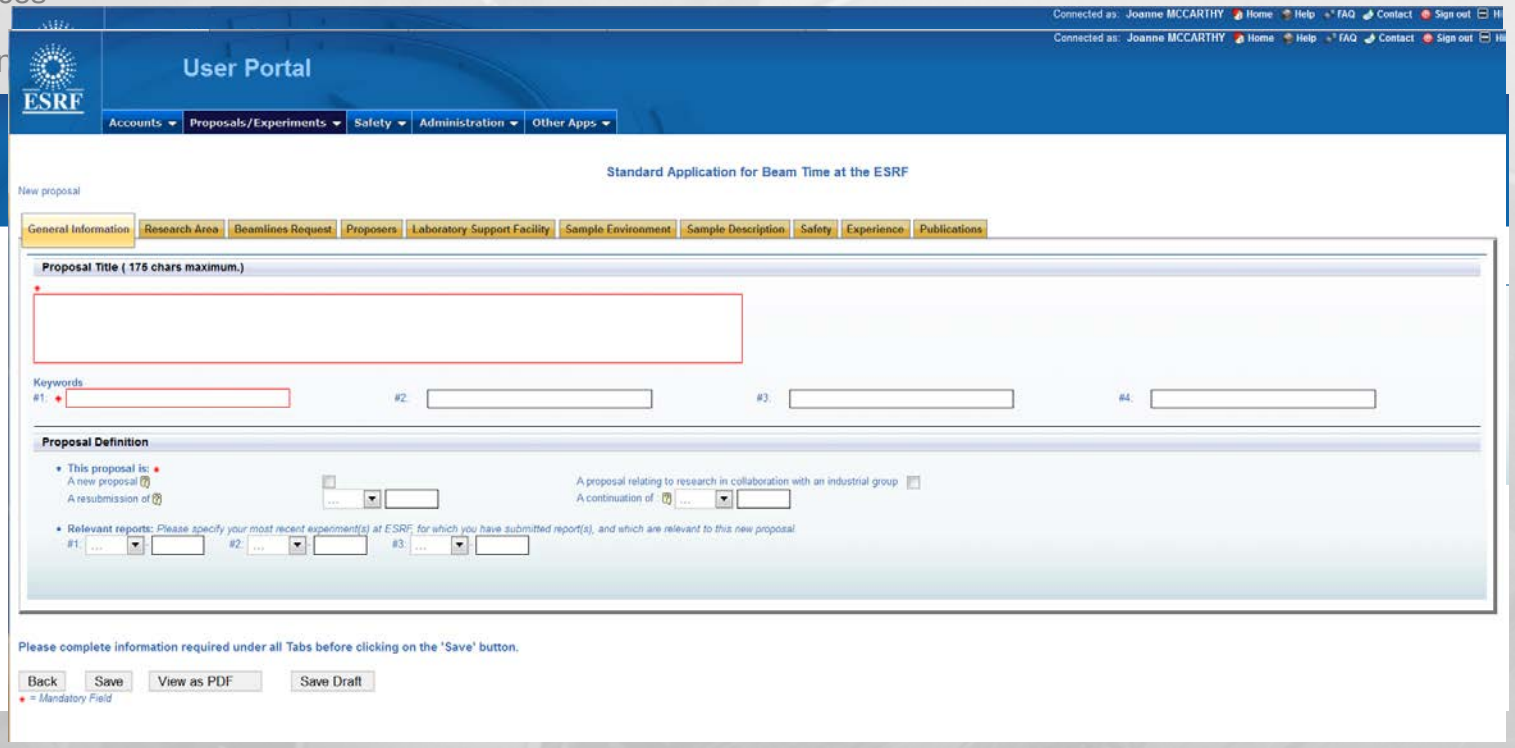


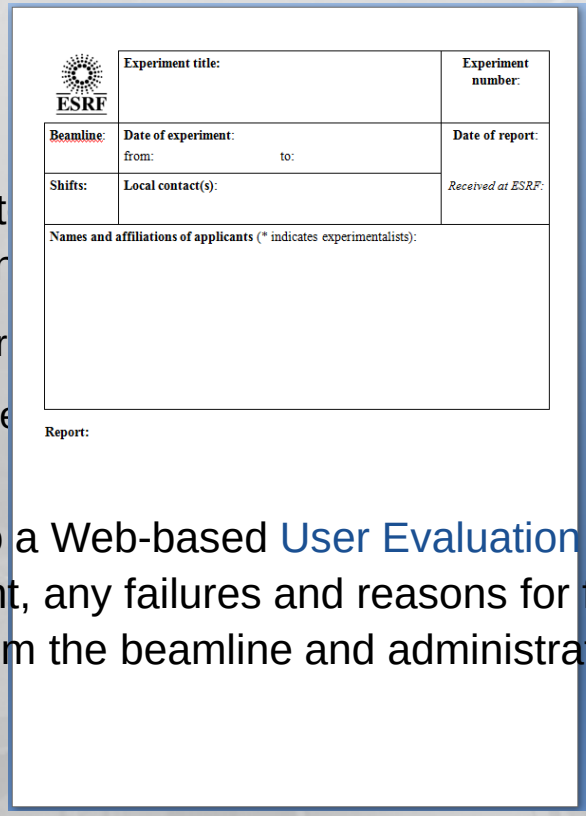
Reports & Publications

Use of PUBLIC ESRF

= OBLIGATION to PUBLISH and REP

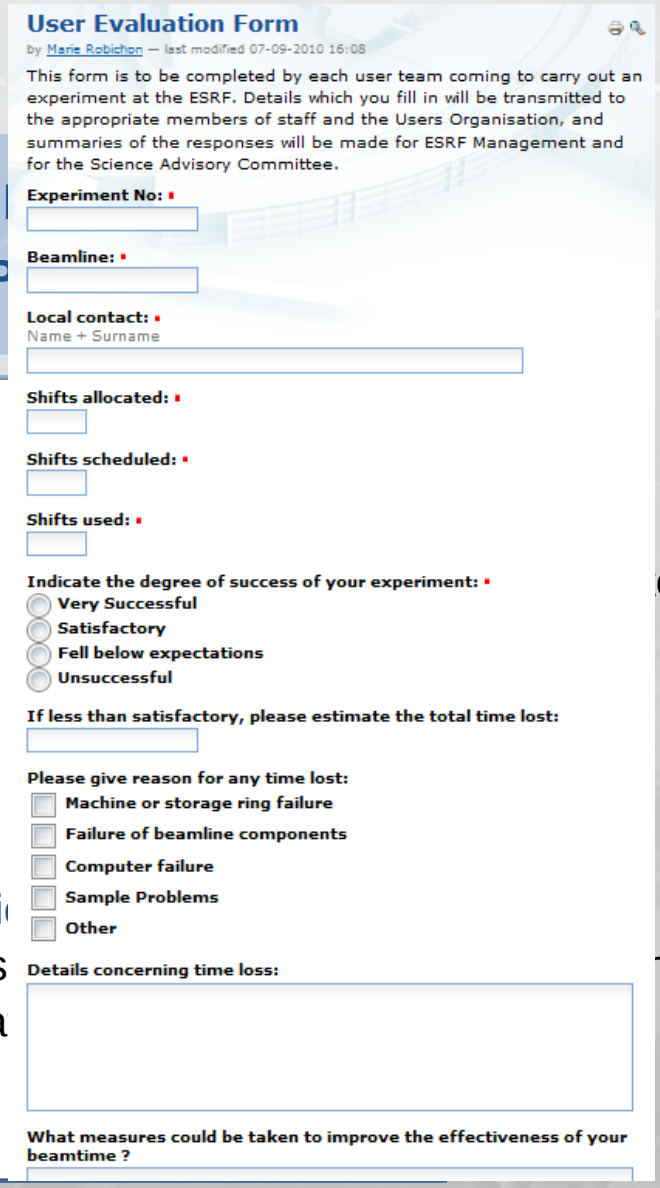
Reporting

- Users allocat … er each experimer
  - forwar
  - require
- There is also a Web-based User Evaluation Questi… their experiment, any failures and reasons for failures … nts, and support from the beamline and administrative sta…



ESRF	Experiment title:	Experiment number:
Beamline:	Date of experiment: from: to:	Date of report:
Shifts:	Local contact(s):	*Received at ESRF:*
Names and affiliations of applicants (* indicates experimentalists):		

Report:



User Evaluation Form

by Marie Robichon — last modified 07-09-2010 16:08

This form is to be completed by each user team coming to carry out an experiment at the ESRF. Details which you fill in will be transmitted to the appropriate members of staff and the Users Organisation, and summaries of the responses will be made for ESRF Management and for the Science Advisory Committee.

Experiment No: ▪

Beamline: ▪

Local contact: ▪
Name + Surname

Shifts allocated: ▪

Shifts scheduled: ▪

Shifts used: ▪

Indicate the degree of success of your experiment: ▪
- Very Successful
- Satisfactory
- Fell below expectations
- Unsuccessful

If less than satisfactory, please estimate the total time lost:

Please give reason for any time lost:
- Machine or storage ring failure
- Failure of beamline components
- Computer failure
- Sample Problems
- Other

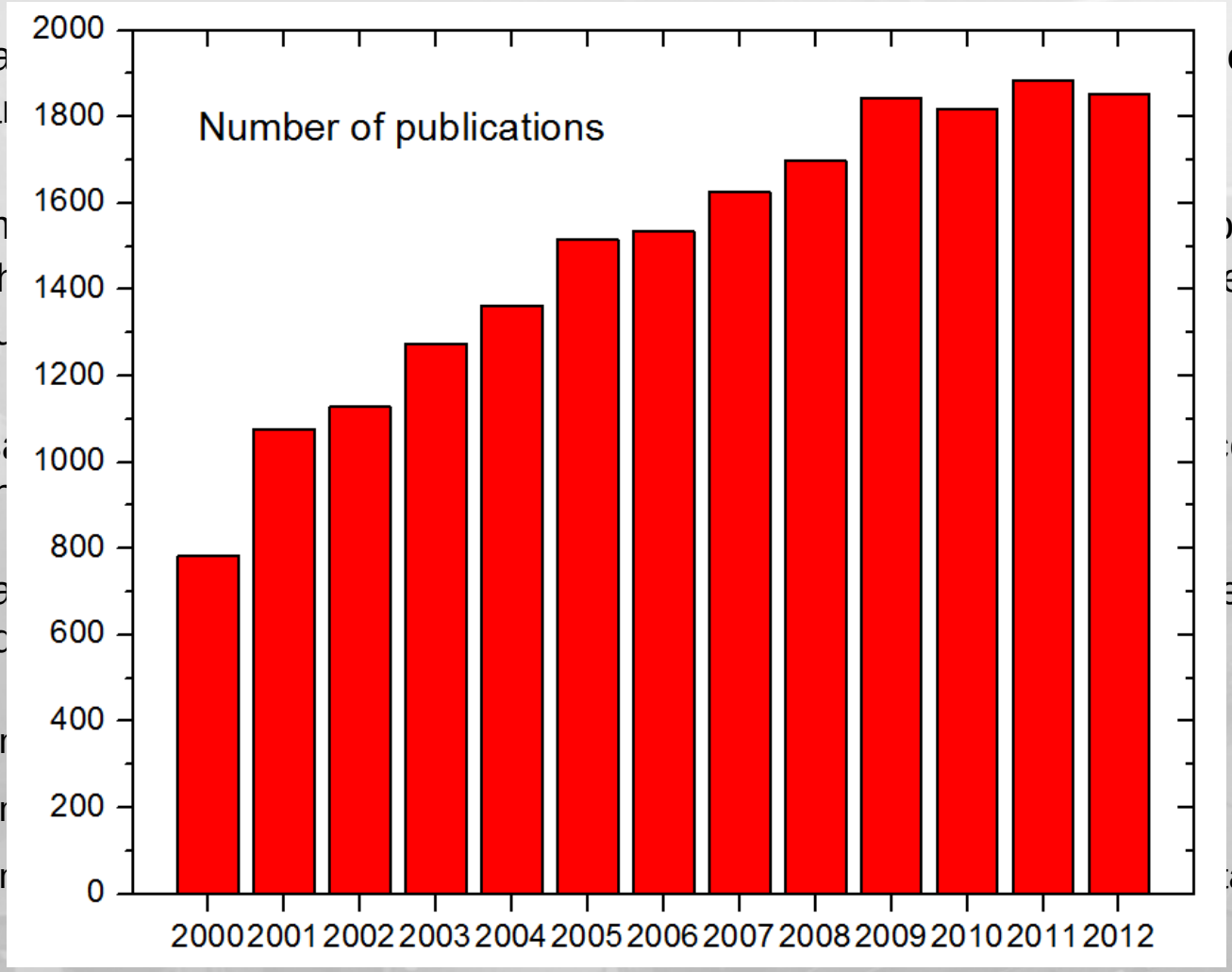
Details concerning time loss:

What measures could be taken to improve the effectiveness of your beamtime ?

After the Experiment

Publications

- Users a … of ESRF public bea…
- Users m… ESRF facilities, th… ed in any ensuing pu…
- Propos… ord….groups not publish…
- Users a… ents made at ESRF by d…
  - r…
  - r…
  - r… tabase



Staffing – User Administration

Collaborating Research Group (CRG) Proposals

CRG Office

1 Head of Service
2.5 administrative staff
Deals with ALL admin areas of CRG operation

Public peer-reviewed proposals

User Office

1 Head of Service
2.3 administrative staff

Proprietary Research Proposals

BDO Office

~4 full time equivalents
(1 administrative staff)

Experiment Registration – formalities

Reception & Travel

~2-3 full time equivalents

MX Schedule coordination

MX BLOM

~1 dedicated person

Safety

Beamline Scientist

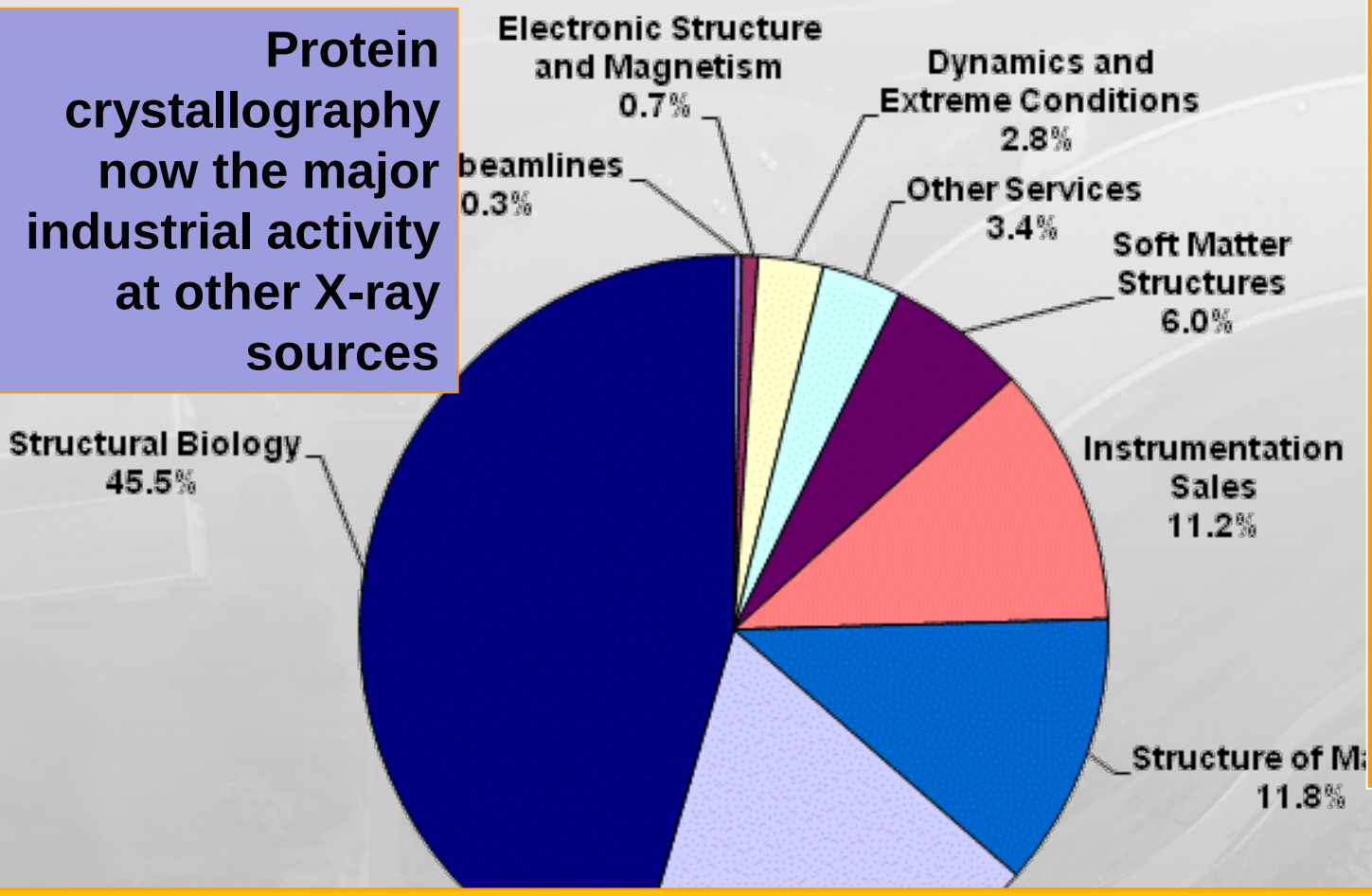
User Office Activities

- **Proposal Review**
  - printing proposals (UO, beamline scientists, committees, Directors, Safety), contacting incomplete submissions, organisation of BTAP meetings (contact members, registration, accommodation, local transport…), correspondence (acknowledgement, decison letters)…..
  - proposal assignment to committees, management of LT proposals, contact with committee members, compilation of data (TF assessments, grades) for panel meetings, fair scientific return and pro rata calculations, processing of results of panel meetings, rejection comments…….
- **Experiment Organisation**
  - validation of beamline schedules, invitation letters, experiment modifications in database, protocols, visa requests, validation of reimbursement claims, pre-validation of all non-standard requests (submitted via email or A-Form), proposal management & archiving….
- **User Meeting & other workshops**
- **SMIS tests & validation**
- **Statistics & Reports**
  - Scientific Use for Council
  - DG Report for AFC (full 6-monthly stats)
  - Beamline Review Panels
  - Annual Highlights
  - BTAP summaries....
- **General User Administration**
  - account and laboratory validation
  - User Web pages
  - BAG administration (groupings, correspondence…)
  - Follow-up of LTP reports
  - Questions & Queries
- **…….**

The Business Development Office

- Dedicated point of contact and organisation for all industrial activities
  - proprietary beam time and customised R&D services (inc. contract research)
  - patents, licences
  - collaborations with industry
  - encouraging industry to use peer review time and LTPs
  - pre-competitive procurement opportunities (more of a wish than reality so far)
  - education and training for industry
  - joint (national, European) grants and partnerships with industry (inc. PhDs etc)
  - building alliances for a better service to industry
  - engineers/scientists for MX and Imaging
- Self-financing (<10% of total income)
- About four full-time equivalents

Protein crystallography now the major industrial activity at other X-ray sources

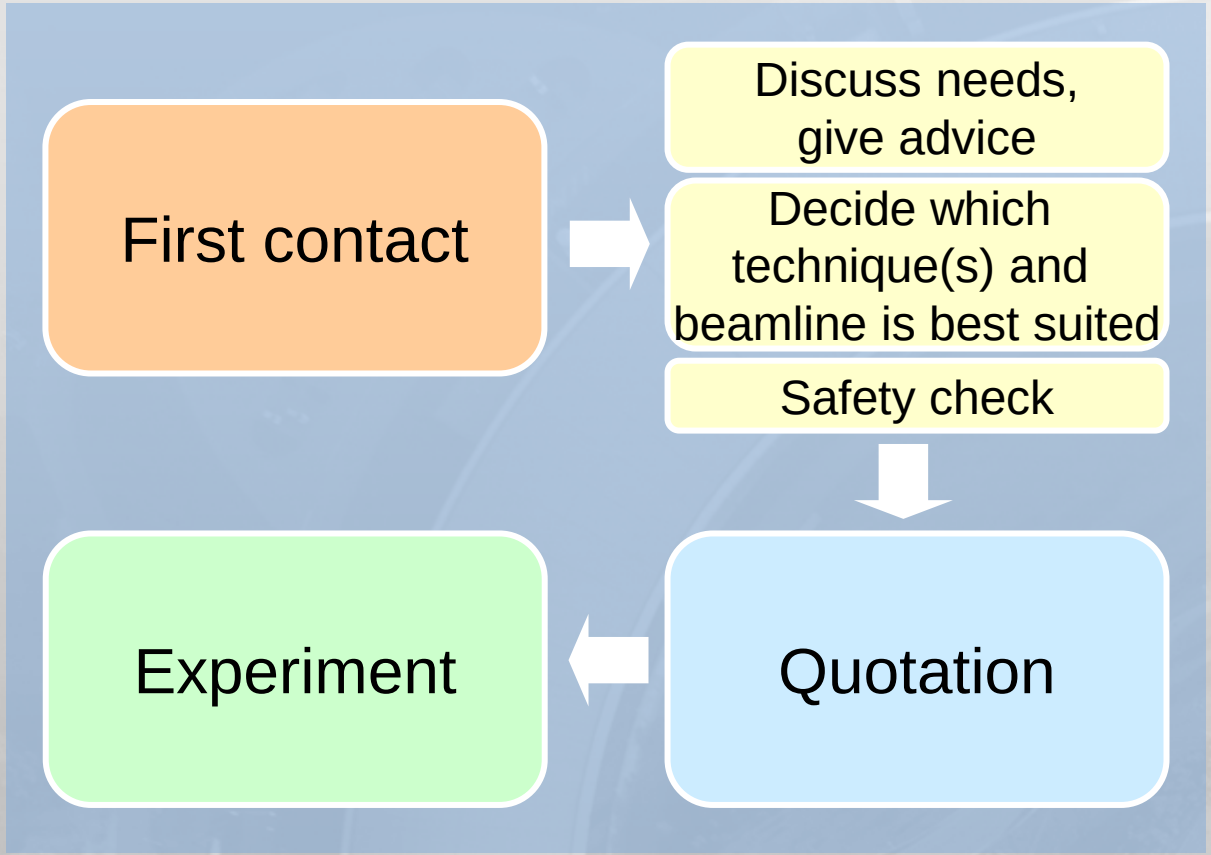


Generated >25MEuros

Used to fund staff positions, purchase new equipment, fund beamlines

- **2011: 2.2MEuros income generated**
- **Beam access by industry represents about 2% of beam time capacity; but about 10% of allocatable income**

BDO manages whole process with industry



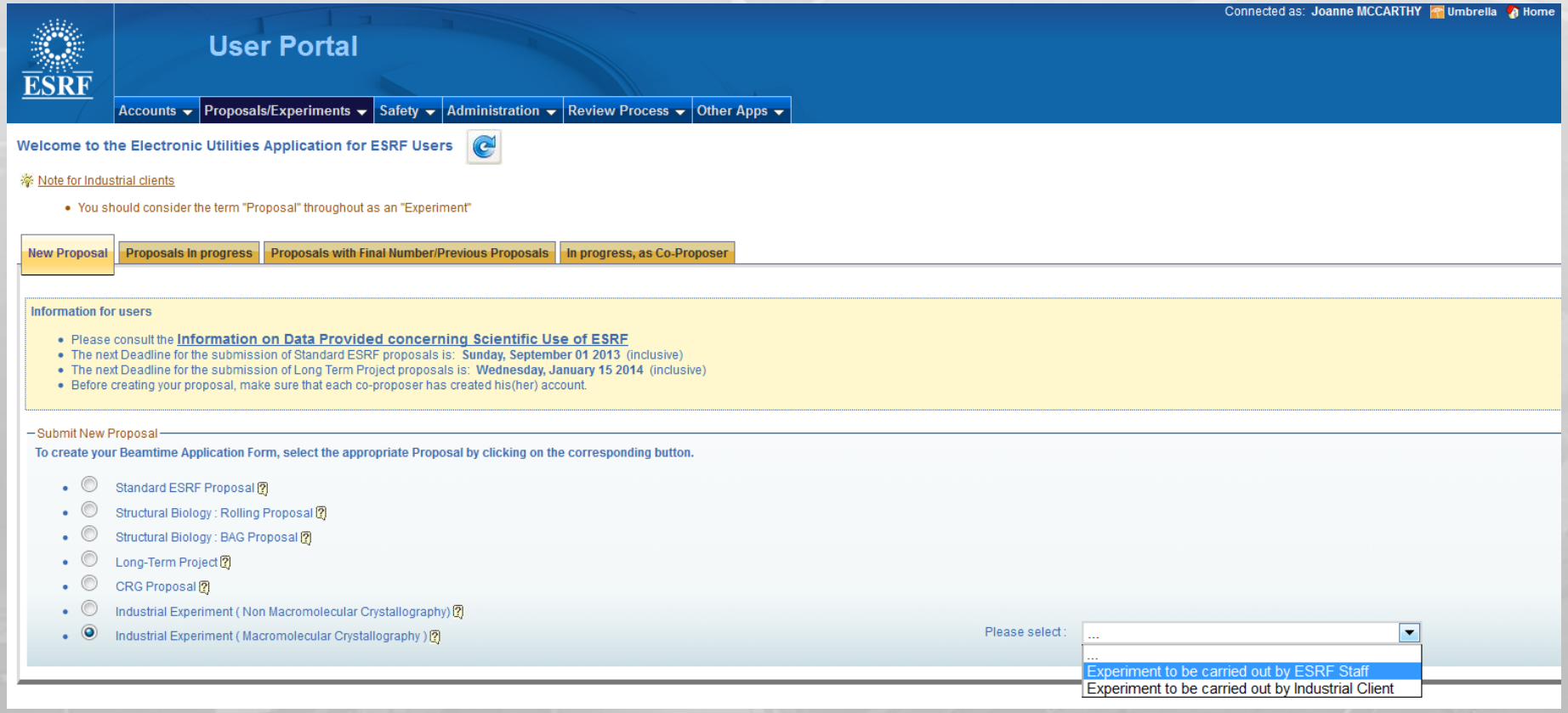
Beamtime Constraints

- < 10% of total beamtime available
- < 30% of beamtime available on single public beamline
- currently have no beamline for 100% PR but could have if requested

APPLICATION FORMS : NON-PEER REVIEWED

NON-MACROMOLECULAR CRYSTALLOGRAPHY Experiments (“IN”)

MACROMOLECULAR CRYSTALLOGRAPHY Experiments (“IX”)



User Community

Users' Organisation

Made up of representatives of the ESRF User community

Members elected by User community (7 scientific areas)

Report to Scientific Advisory Committee and Management every 6 months on feedback from Users, organise the ESRF Users Meeting in conjunction with User Office

The Users Organisation Committee (UOC)

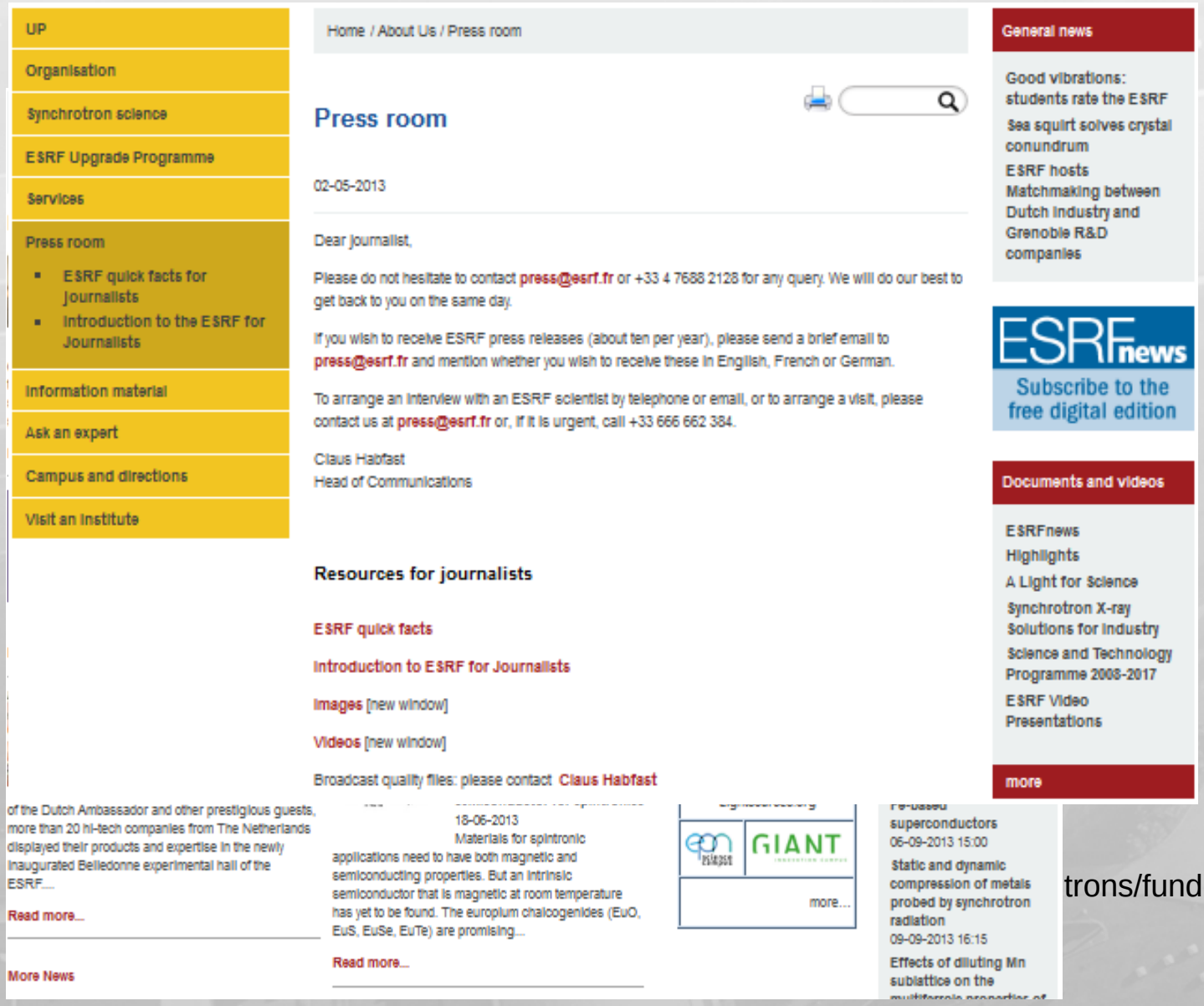
Thomas Buslaps (ESRF) - ESRF local liaison
Paola Coan - X-ray imaging
Olivier Diat - Soft matter structures
Christian Kumpf - Surface and interface science
Chiara Maurizio (chairperson) - Structure of materials
Claudio Mazzoli - Electronic structure and magnetism
Chrystele Sanloup - Dynamics and extreme conditions
Beatrice Vallone - Structural biology

User Meeting

Annual ESRF Users' Meeting associated with 2-3 satellite workshops

Takes place typically in February each year

More than 300 users attend the Users Meeting



trons/funding bodies)

Education & Outreach

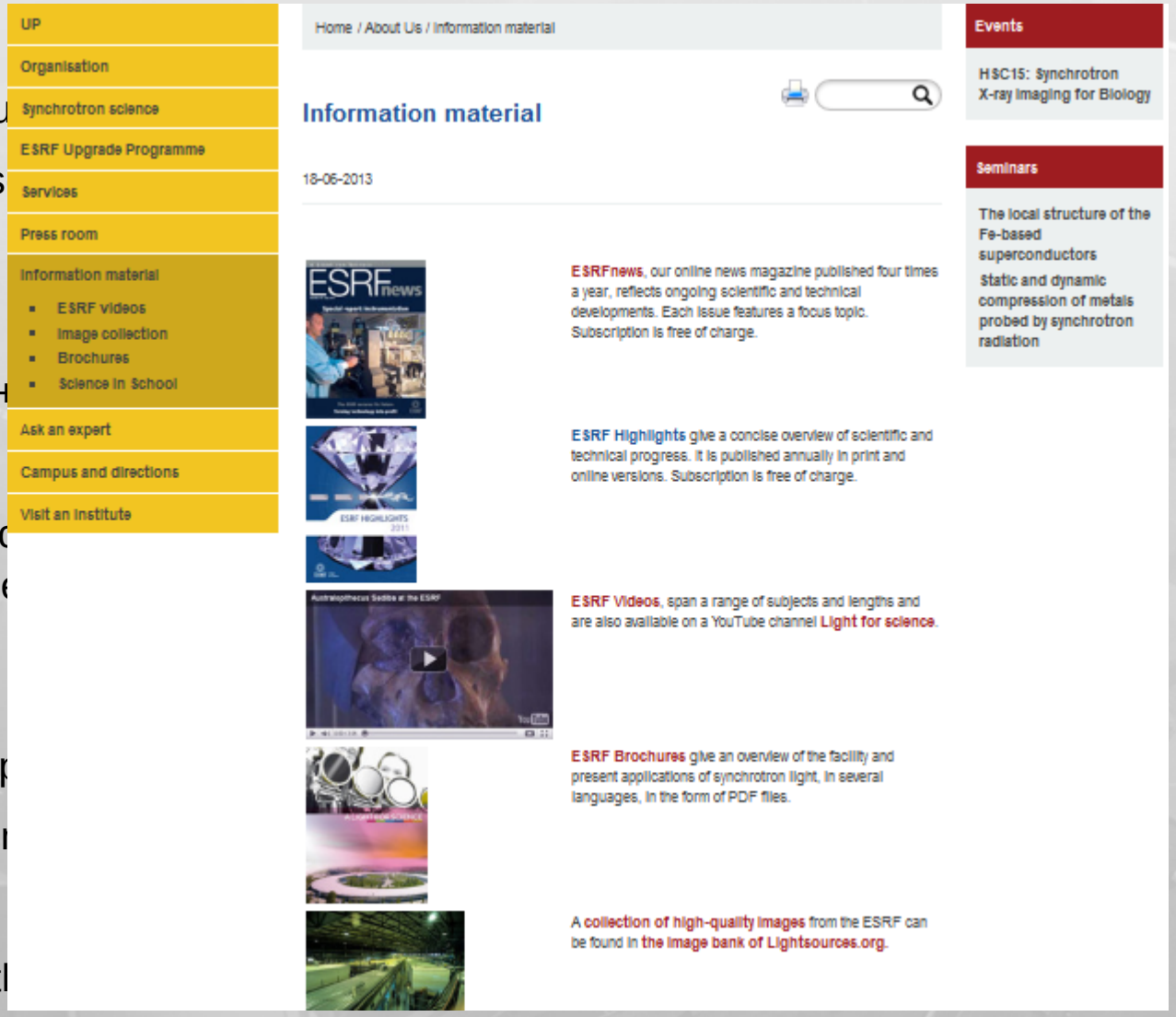
Printed Publications

- ESRFnews
  - news magazine pu
  - nearly 10000 subs
- ESRF Highlights
  - annual report
  - 3500 print copies +
- Specific brochures
  - e.g. in 2013, impac

  (science, innovation, e

Visitors Centre

- Currently 4000 visitors p
- Scientists and non-scie
- Have capacity for up to
- New Visitors Centre wit




Thank You
for your attention!