

ESRF

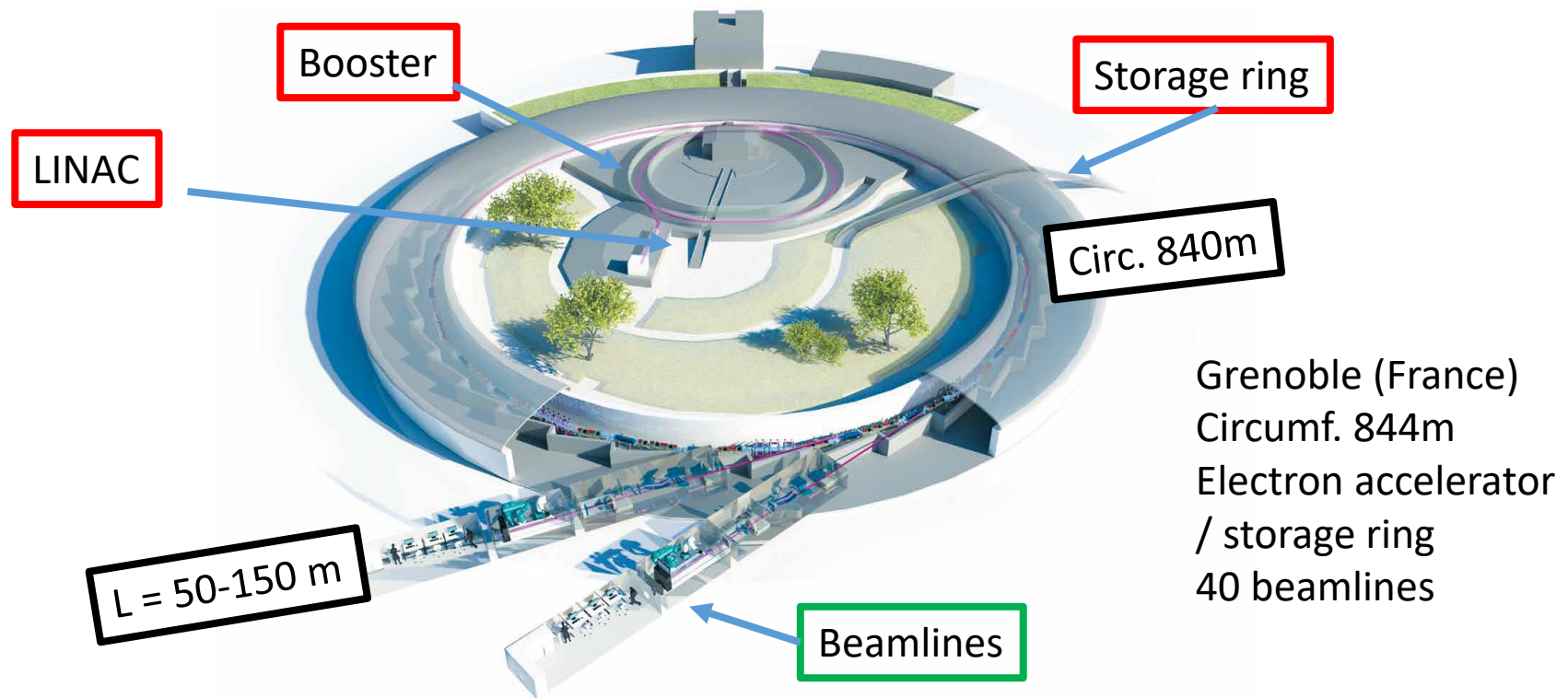
F. d'Acapito, CNR, ILO for ESRF

Layout

- Description of ESRF
- The accelerator complex and related technologies
 - The beamlines and related technologies
 - Conclusion

What is ESRF

- Machine for production of hard X-rays



ESRF development plan

Accelerator complex (2014-2019)

- EBS ring

Beamlines (2019-2023)

- 4 new BLs
- 6 Refurbished

Accelerator complex

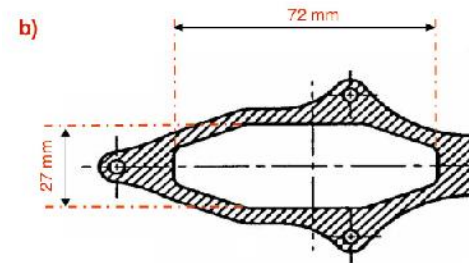
Long vacuum tube
Magnets
Supports
Ion pumps



Accelerator complex

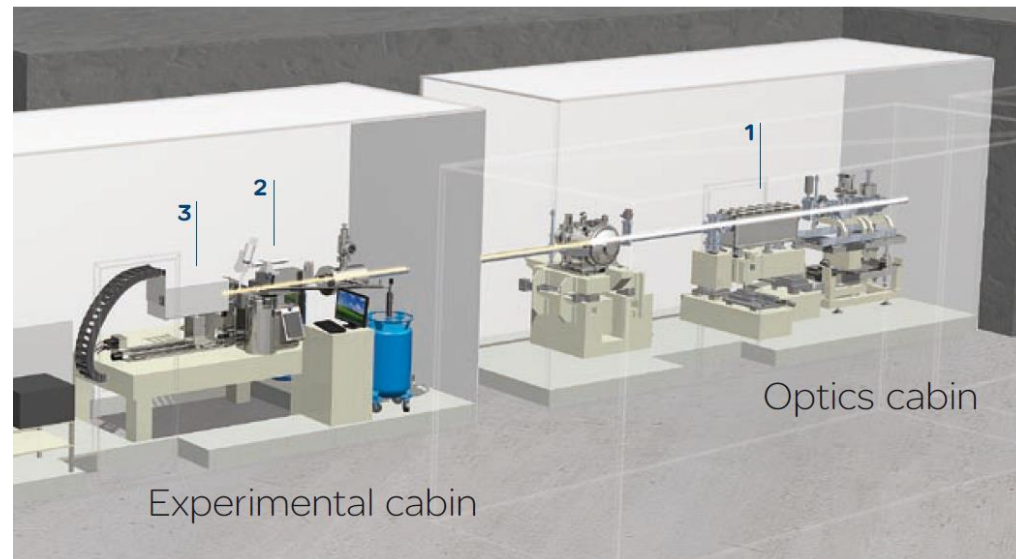
Relevant technologies

- Vacuum (10^{-10} mbar)
 - Special chambers
 - Ion pumps, NEG coatings
- Magnetic systems (a few T, periodic structures)
- High power electronics
- Big contracts
- Bulky Serial production
- Few calls



Beamlines

- Small contracts (50-500 KEE)
- Prototypes or limited production
- Extremely varied.



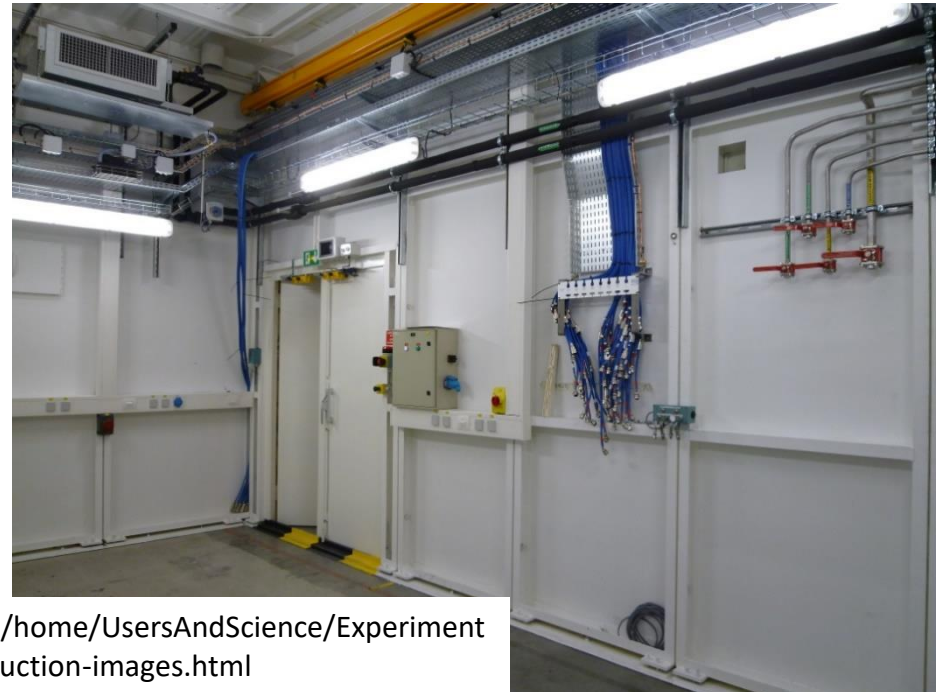
Beamlines

Civil Works - Engineering

- Lead cabins



○ <https://www.esrf.eu/home/UsersAndScience/Experiments/CRG/BM16/construction-images.html>



Beamlines

'Big' Mechanics

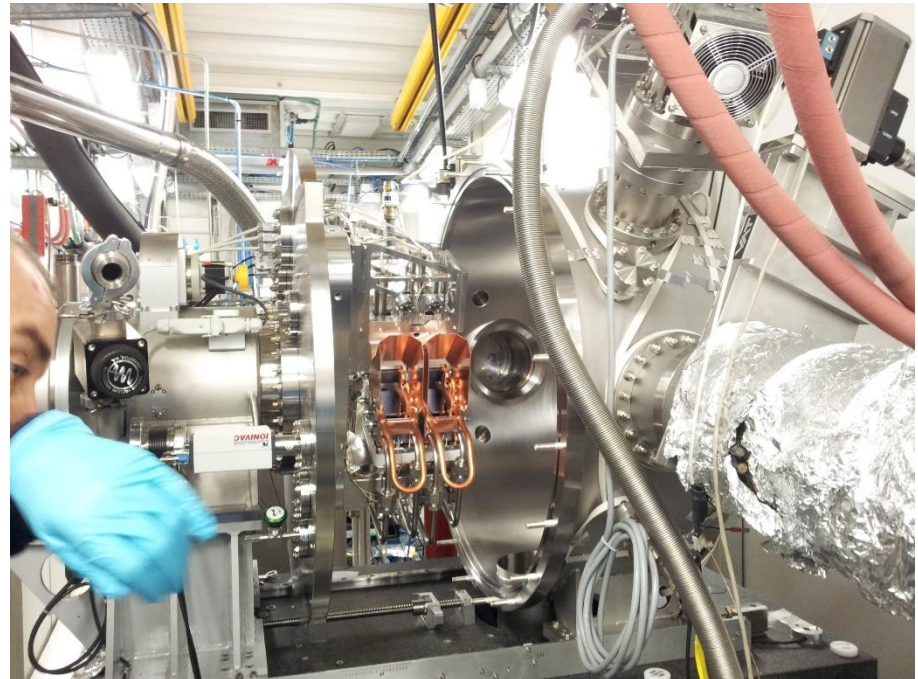
- Supports, benches
- Vacuum chambers



Beamlines

Precision mechanics

- Monochromators
- Sample manipulators
- Mirror positioning
- $1\mu\text{m}$, $1\mu\text{rad}$



Beamlines

Electronics

- ADC & Signal analysis (MCA)
- Current amplifiers
- Stepping Motor controllers



Beamlines

Cryogenics

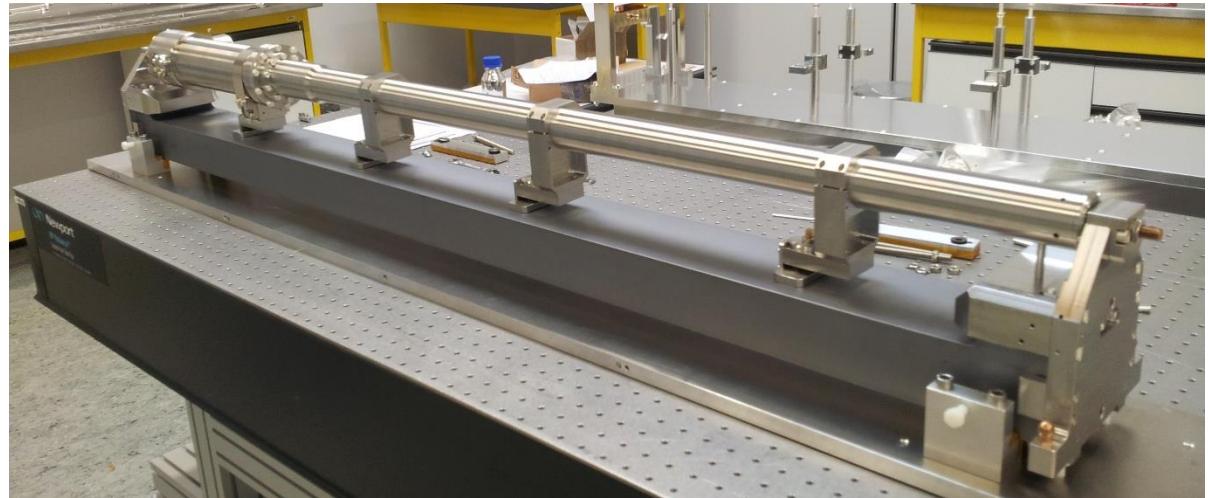
- Super Insulated Vacuum Lines
- Cryostats
- Cryocirculators
- Reservoirs



Beamlines

X-ray Optics

- Mirrors, Multilayers
- Flat or curved ($R=10^1-10^3$ m)
- λ 2.5-0.3 Å
- Cooled
- High form ratio
- Si substrate



Beamlines

Data treatment

- 2D detectors: high frame rate and high resolution => several tens MB per image, > 10 images /s
- Onsite data treatment
- 1MW data center
 - GPU processing units
 - Several PB data Storage



Conclusion

- ESRF a considerable opportunity for business in the next years.
- Activities concentrated on beamline refurbishment.
- In line with the other similar big project in Italy, ELETTRA-2.
- Contact the ILOs and inform us about your production field
 - dacapito_AT_esrf.fr
 - elisabetta.narducci_AT_cnr.it
 - www.ilonetwork.it