

AfLS2 Outputs: Reaffirmation of the Grenoble Resolutions and Revised Roadmap2

Additions to the First Roadmap are indicated in red.

Grenoble Resolutions towards the African Light Source

- 1. Advanced light sources are the most transformative scientific instruments similar to the invention of conventional lasers and computers.**
- 2. Advanced light sources are revolutionizing a myriad of fundamental and applied sciences, including agriculture, biology, biomedicine, chemistry, climate and environmental eco-systems science, cultural heritage studies, energy, engineering, geology, materials science, nanotechnology, palaeontology, pharmaceutical discoveries, physics, with an accompanying impact on sustainable industry.**
- 3. The community of researchers around the world are striving collaboratively to construct ever more intense sources of electromagnetic radiation, specifically derived from synchrotron light sources and X-ray free-electron lasers (XFELs), to address the most challenging questions in living and condensed matter sciences.**
- 4. The African Light Source is expected to contribute significantly to the African Science Renaissance, the return of the African Science Diaspora, the enhancement of University Education, the training of a new generation of young researchers, the growth of competitive African industries, and the advancement of research that addresses issues, challenges and concerns relevant to Africa.**
- 5. For African countries to take control of their destinies and become major players in the international community, it is inevitable that a light source must begin construction somewhere on the African continent in the near future, which will promote peace and collaborations among African nations and the wider global community.**

Roadmap Short-term (<3 years)

- Train African researchers and students in the design, operation and utilization of advanced light sources (AdLSs).
 - LAAAMP's FAculty-STudent (FAST) Team AdLS training program began the utilization part of this task in 2017.
 - Need to expand by fundraising.
 - NSLS-II and INCREASE (increaseonline.org) are developing Online Course with limited current distribution.
- Establish formal partnerships with existing light sources.
 - South Africa has already signed in 2013 a medium-term arrangement with the ESRF at 0.3% contribution to the budget.
 - Need to form an advanced light source Consortium to become a collaborative Member at an existing AdLS.
- Promote the involvement of industry.
 - Identify an industrial leader, such as SASOL.
 - Identify industrial person to serve on AfLS Foundation Executive Committee.

Roadmap Short-term (<3 years) cont'd

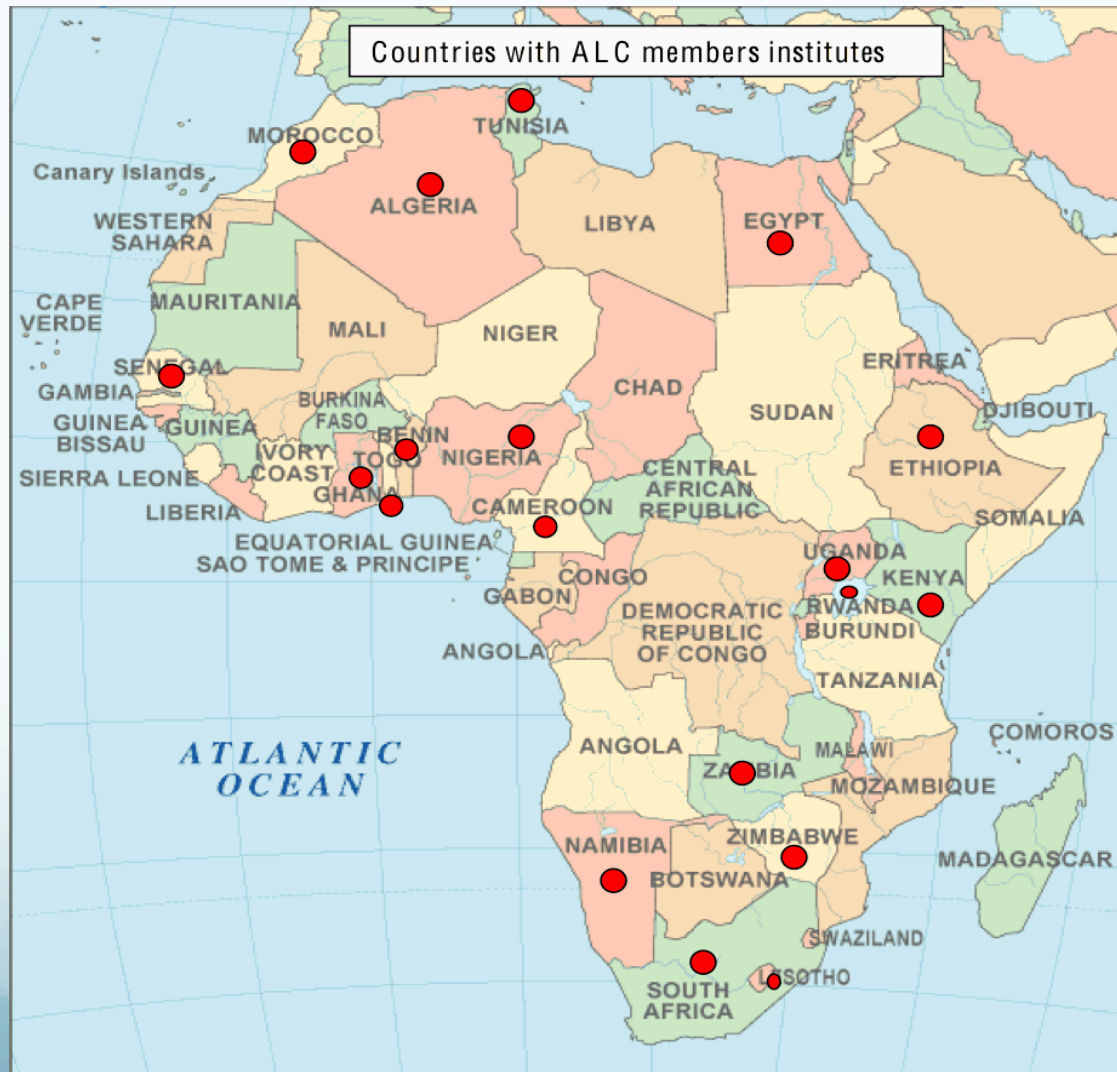
- **Establish and enhance Africa's critical feeder infrastructure that empowers light source science.**
 - **Micro Level**

Collaborate with the African Laser Centre (ALC) to develop researchers' sample preparation and screening facilities.
 - **Macro Level**

Establish Regional Research Centers

 - **Northern region**
 - **Western Region**
 - **Eastern Region**
 - **Southern Region**

Locations of ALC Institutions



Roadmap Short-term (<3 years) cont'd

- **Promote outreach and communication to policymakers and public.**
 - **Send representatives to Presidents and their Cabinets**
Already started by Thierry d'Almeida, Nkem Nkumbah, Prosper Ngabonziza...
 - ***LAAAMP* Brochure available in hardcopy and for download in English, French, Spanish. Arabic coming soon!!**
See <https://laaamp.iucr.org/tasks/brochure>
Contact the Editor, Ernie Malamud
(malamud@foothill.net), for hardcopies.

Roadmap Short-term (<3 years) cont'd

- Study the feasibility of constructing African multinational beamlines at existing light sources, with partners.
 - **Form consortium to construct a beamline at an existing AdLS.**
 - **Perhaps the same one for which there is a Consortium Membership.**
- **Develop a *Strategic Plan* for submission to African Gov'ts.**

African Academy of Sciences could play a leading role in this.
- **Develop an AfLS non-site specific Pre-Conceptual Design Report.**

Roadmap Short-term (<3 years) cont'd

- **Develop a dynamic (always current) professional quality AfLS Website.**
- **Spread fluency in English throughout the African continent.**

English is the international language of science, technology and business.

Roadmap Medium-term (<5 years)

- **Conduct a feasibility study, including costs, for an African latest generation light source, with requisite infrastructure.**
 - **To save time and money, this could be a copy of an existing 4th generation light source: MAXIV, Sirius..**
- **Develop a detailed Business Plan.**
- **Develop a Governance Model.**

Roadmap Long-term (>5 years)

- **Complete the Technical Design Report (TDR) with site selection.**
- **Establish the AfLS as a legal entity.**
 - **This has been done: African Light Source Foundation.**
 - **Registered in South Africa**
- **When approved by a sufficient number of African governments, begin the construction of an African latest generation advanced light source, with requisite infrastructure.**