

Equipment Sponsorship & International Partnership Prospectus

Building an expandable, multidisciplinary network of real scientific laboratories accessible remotely from Africa and beyond.

Proposed Physical Host: Jaramogi Oginga Odinga University of Science and Technology (JOOUST), Kenya

Proponent: AfriRemoteLabs

Existing Partnership: AfriRemoteLabs-JOOUST Memorandum of Understanding



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An invitation to transform access to experimental science

AfriRemoteLabs invites manufacturers of scientific instruments, universities, research institutes, technology firms, philanthropic organizations, development agencies, and individual supporters to help establish and progressively expand a physical centre of programmable scientific equipment hosted at JOOUST. The equipment will be operated through secure online interfaces by authorized students, researchers and educators who may be hundreds or thousands of kilometres from the laboratory.

This is a request for access to real experiments, not merely simulation software or a computer laboratory. Remote users should be able, where technically and safely feasible, to change experimental parameters, actuate instruments, observe live measurements or video, acquire authentic datasets and analyze results. Contributions may be equipment, funding, expertise, connectivity, software, infrastructure, training or sustained operational support.

At a glance

Dimension	Master commitment
Physical centre	A JOOUST-hosted laboratory or interconnected laboratories, subject to site readiness and implementation agreements.
Digital access	AfriRemoteLabs platform for identity, reservations, safe remote control, live observation and data access.
Audience	Students, educators, researchers and collaborating institutions across Africa and globally.
Scope	All disciplines and instruments that can be controlled remotely or responsibly adapted.
Scale	Expandable; no predetermined number of experiments, sites, instruments or financial cap.
Partnership basis	Existing MOU with JOOUST; detailed obligations and ownership to be agreed per contribution.

1. Strategic rationale

Many learners and investigators face limited access to costly equipment, specialist technicians, consumables and advanced measurement systems. Sharing real instruments through scheduled remote sessions can improve utilization of scarce infrastructure, enable repeatable experiments, connect institutions to expert support and broaden practical learning without requiring every institution to purchase an identical laboratory.

The initiative is designed to complement and not replace hands-on local laboratory instruction. Activities that require direct tactile skills, hazardous procedures or close supervision will continue to require appropriate on-site provision. Remote access will be introduced only where safety, learning outcomes, equipment protection and data integrity can be maintained.

2. Vision, mission and intended outcomes

Vision: An inclusive Pan-African scientific ecosystem in which location and institutional resources do not determine whether a learner or researcher can access high-quality experimental equipment.

Mission: Establish, integrate, maintain and share programmable physical scientific instrumentation through secure, reliable and educationally effective remote laboratories.

- Expand equitable access to real experimental measurements and instrumentation.
- Strengthen practical STEM teaching, postgraduate training and collaborative research.
- Enable universities and research groups to share specialized instruments responsibly.
- Develop African expertise in laboratory automation, instrumentation, cybersecurity and scientific software.
- Create sustainable equipment maintenance, technical training and support mechanisms.

3. Institutional foundation and implementation roles

AfriRemoteLabs and JOOUST have an existing Memorandum of Understanding. The MOU provides a collaboration foundation; this prospectus does not assume any particular contractual terms beyond the existence of that agreement. Project-specific schedules should confirm space, safety approvals, asset ownership, insurance, personnel, procurement, data responsibilities and access conditions before deployment.

Participant	Indicative role, subject to agreement
AfriRemoteLabs	Partnership development; platform design and integration; user onboarding; scheduling; outreach; reporting and service coordination.
JOOUST	Host facilities and institutional coordination; laboratory safety and physical security; designated technical personnel; local operational approvals.
Equipment sponsors	Donate, loan, discount or co-develop instruments; provide specifications, interfaces, warranties, training and servicing options.
Academic collaborators	Co-design experiments, validate learning outcomes, mentor users, co-supervise projects and support joint research.
Funding partners	Support infrastructure, shipping, integration, operations, scholarships, capacity building and evaluation.

4. Open and multidisciplinary equipment programme

The categories below are illustrative, not an exhaustive purchase list or a restriction on eligible contributions. The programme welcomes basic teaching apparatus, advanced analytical instruments

and emerging scientific technologies, provided their operation can be made appropriate for remote access.

Domain	Examples of candidate programmable equipment / remote experiments
Physics and optics	Oscilloscopes, function generators, motion systems, spectrometers, interferometers, optical stages, electromagnetism rigs, thermal and mechanical test benches.
Chemistry	UV–Vis/FTIR instruments, automated titrators, programmable pumps, electrochemistry workstations, pH/conductivity systems, robotic liquid handling.
Biology and biotechnology	Digital microscopy, controlled incubators, environmental monitoring, imaging platforms and non-hazardous automated measurements.
Engineering and electronics	DAQ systems, PLCs, microcontrollers, robotics rigs, control systems, power electronics, motor drives, signal analyzers, renewable-energy demonstrators.
Materials and nanoscience	Remote microscopy, XRD or Raman systems with approved remote interfaces, thermal analysis, electrical characterization, programmable deposition and test equipment.
Environment and earth sciences	Water-quality probes, weather stations, remote sensing receivers, hydrology rigs, air-quality analyzers and IoT environmental networks.
Computing and interdisciplinary	Edge controllers, robotic automation, machine vision, AI-enabled instrument monitoring, digital twins and cyber-physical systems.

5. What qualifies as a remotely operable instrument?

Equipment may be supplied with native remote interfaces or retrofitted through approved control modules. Every proposed contribution will undergo a feasibility and safety review before acceptance.

Requirement	Preferred capabilities / decision criteria
Programmatic control	Documented API, SCPI, SDK, LabVIEW, Python, OPC UA, Modbus or equivalent; defined command permissions.
Data capture	Time-stamped digital outputs, exportable formats, metadata and traceable measurement units.
Remote observation	Camera views or instrument screen streaming when helpful; suitable lighting and privacy controls.
Actuation	Safe control of motors, relays, stages, heaters, pumps or setpoints with bounded operating ranges.
Safety	Emergency stop, interlocks, local override, watchdogs, fail-safe defaults and supervised operation where needed.
Reliability	Calibration, diagnostics, maintainability, spare parts, power conditioning and network resilience.

Security	Least-privilege access, authentication, segmented instrument networks, audit trails and patch management.
Support	Installation instructions, licensing rights, training, service documentation and realistic lifecycle costs.

6. End-to-end remote laboratory experience

- A user discovers an experiment, its learning objectives, available time slots and prerequisites.
- The platform authenticates the user, checks authorization and reserves an exclusive session if required.
- The user connects to a constrained control interface rather than directly exposing an instrument to the public internet.
- Commands are validated against equipment safety limits and transmitted through a secure gateway.
- Live video, readings and experiment status are displayed during the session.
- Data, metadata and an activity log are saved and made available according to the applicable access and privacy policy.
- The system returns the instrument to a safe state, performs checks and releases it for the next session.

7. Reference technical architecture

The proposed architecture has six layers: (1) web portal and user identity; (2) booking, access policy and learning content; (3) secure application and experiment-control APIs; (4) on-site gateway and instrument network; (5) programmable instruments, sensors and cameras; and (6) data storage, observability and reporting. A digital twin or simulation may be used for preparation, but actual experimental outputs must remain clearly distinguishable from simulated data.

Instrument controllers should initiate secure outbound connections where possible. Public users must not be granted unrestricted remote-desktop access or direct access to laboratory controllers. Role-based permissions, encrypted communications, time-limited sessions, monitoring, backups, disaster recovery and maintenance windows should be designed from the outset.

8. Partnership and sponsorship opportunities

Contribution pathway	Illustrative contributions
In-kind donation	New or serviceable programmable instruments, controllers, sensors, accessories, spare parts and calibration tools.
Equipment loan / demonstration	Time-limited placement, joint pilot testing, evaluation equipment and manufacturer-supported demonstration stations.
Discounted procurement	Academic pricing, volume discounts, refurbished systems, concessional leasing and bundled maintenance.

Financial sponsorship	Laboratory fit-out, networking, power, shipping, customs, insurance, installation, software, staffing and operating reserves.
Technology and software	Control APIs, licenses, cloud credits, device gateways, security tools, experiment interfaces and learning-management integration.
Capacity building	Technician training, visiting experts, fellowships, curriculum development and train-the-trainer programmes.
Research partnership	Joint experiments, instrumentation development, calibration studies, co-publications and student research placements.
Long-term stewardship	Preventive maintenance, annual calibration, replacement parts, equipment upgrades and user-support services.

9. Sponsorship principles: flexible, transparent and non-exclusive

AfriRemoteLabs seeks partnerships of varying scale. No single manufacturer, funder or discipline is expected to underwrite the entire programme. Support may be unrestricted within an agreed mission, or restricted to a laboratory, instrument, cohort, technical milestone or defined work package.

No fixed monetary ceiling or predetermined instrument count is imposed by this master prospectus. Costed project budgets, procurement schedules and delivery milestones will be prepared separately for each prospective partner. Naming, branding, intellectual property, data access, publication rights, exclusivity, service levels and any commercial terms must be negotiated and recorded explicitly.

10. Phased implementation without a fixed endpoint

Stage	Indicative activities and decision gates
Foundation and readiness	Confirm host space, power, connectivity, personnel, site survey, safety reviews, partnership governance and first sponsor commitments.
Demonstration and validation	Commission initial instrument(s); test remote control, latency, safe shutdown, accessibility, learning outcomes and user feedback.
Multidisciplinary expansion	Add instruments and experiments according to demand, technical feasibility, sponsor interest and institutional capacity.
Regional network development	Connect additional approved host laboratories and collaborating institutions through common platform standards.
Long-term operations	Establish sustainable support, calibration, maintenance, renewal, impact evaluation and periodic technology upgrades.

11. Infrastructure and operational requirements

- Appropriate laboratory benches, secure rooms, environmental controls and equipment storage.
- Stable electricity, surge protection, UPS capacity and, where needed, backup generation.
- Reliable internet with monitoring, traffic prioritization and secure network segmentation.

- Local technicians and laboratory safety personnel able to intervene physically.
- Calibration schedules, asset inventory, preventive maintenance, spare parts and vendor support.
- User help desk, documentation, accessibility accommodations and training materials.
- Documented incident response, insurance and regulatory compliance as applicable to each instrument.

12. Safety, ethics, cybersecurity and responsible access

Remote control introduces distinctive risks because users may be unable to see all local hazards. Experiments involving high voltage, lasers, heat, pressure, biological agents, chemical reagents, radiation or moving machinery must be risk-assessed individually. Where remote operation is not appropriate, equipment may instead be offered for supervised demonstrations, queued measurements or staff-operated services.

Cybersecurity safeguards should include multifactor authentication for privileged users, segmented laboratory networks, strict command validation, secure secrets management, session recording where appropriate, vulnerability management and tested recovery procedures. Research data should be governed through explicit consent, licensing, retention and institutional policies; sensitive or proprietary results must not be made public by default.

13. Governance, ownership and accountability

Before equipment is transferred or installed, the parties should agree in writing on the receiving entity, customs and import responsibilities, asset register, ownership or loan status, depreciation, maintenance obligations, service warranties, replacement policy, insurance, access fees (if any), acceptable use and end-of-life disposal.

A joint coordination mechanism may include representatives of AfriRemoteLabs, JOOUST, technical teams and relevant partners. Its responsibilities could include approving equipment priorities, reviewing safety, monitoring use, assessing impact and resolving operational issues. Final governance arrangements should align with the signed MOU and subsequent agreements.

14. Financial sustainability: open-ended funding model

The master programme has no single prescribed budget. Each equipment package will be accompanied by a tailored bill of materials and a full lifecycle-cost assessment. Sponsors may finance capital acquisition, transport, installation, integration, consumables, licenses, maintenance, technical staff, electricity, connectivity, training, student access subsidies or multi-year operations.

Potential long-term sustainability mechanisms include institutional contributions, sponsored student access, collaborative grants, research service agreements and carefully designed cost-recovery arrangements, subject to equitable access, partner terms and applicable university policies. No revenue or cost savings are assumed in this prospectus.

15. Monitoring, evaluation and learning

Impact area	Illustrative indicators
Access and equity	Number of institutions, countries, active users, sponsored sessions and accessibility accommodations.
Educational outcomes	Completed experiments, student feedback, assessment performance and instructor adoption.
Research activity	Datasets generated, research projects supported, collaborative publications and instrument utilization.
Operational performance	Uptime, completed sessions, mean time to recovery, calibration compliance and safety incidents.
Capacity building	Technicians trained, teaching modules developed, local integrations completed and staff certifications.
Sustainability	Recurring support secured, annual maintenance coverage, lifecycle cost per experiment and equipment renewal.

16. Value proposition for international partners

- Demonstrable scientific and educational impact through access to actual measurements.
- Visible contribution to research capacity and digital scientific infrastructure in Africa.
- Opportunities for instrument validation, joint R&D, training and curricular collaboration.
- Responsible acknowledgement in project reports, public communications and events where agreed.
- Documented utilization, performance and impact reports proportionate to the partnership.
- Potential participation in a growing multi-institutional remote-laboratory network.

17. Partner engagement and due diligence pathway

Step	Action
1. Expression of interest	Partner indicates equipment, expertise, funding or collaboration available.
2. Technical dialogue	Joint assessment of remote-control capabilities, safety, data formats, support and user needs.
3. Site and legal review	Confirm JOOUST readiness, receiving arrangements, import compliance, ownership and partner obligations.
4. Project-specific agreement	Agree scope, budget or in-kind valuation, delivery dates, warranties, visibility and reporting.
5. Commissioning	Install, integrate, validate, document and train responsible operators.
6. Impact reporting	Monitor access, safety, reliability, learning and research results; plan next phase.

18. Illustrative prospective partner categories

Potential collaborators include programmable instrumentation manufacturers; laboratory automation and robotics vendors; scientific software developers; universities with remote laboratory expertise; professional engineering and science societies; foundations supporting STEM and higher education; regional and multilateral development organizations; connectivity and cloud providers; and diaspora research networks. Any named organization approached under this programme is a prospective partner unless and until a commitment is confirmed.

19. Invitation to participate

AfriRemoteLabs welcomes proposals for single instruments, complete instrument suites, pilot experiments, technical services, scholarships, co-developed research facilities, or multi-year strategic partnerships. We invite potential partners to identify what they can contribute and to participate in a technical and institutional scoping discussion.

Suggested information for an initial conversation: instrument model and condition; native software interfaces; safety constraints; support and licensing terms; expected installation requirements; shipping or import conditions; desired educational or research outcomes; and proposed partnership timeframe.

Contact and next steps

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Institutional note: AfriRemoteLabs and JOOUST have an existing MOU. This document is an invitation to collaborate, not a representation of committed funding, equipment, or specific obligations under that MOU.