



All Things Lab and Testing (ATLT) Exposition and Dialogues

3RD - 5TH OCTOBER 2024
SARIT EXPO CENTRE,
NAIROBI, KENYA.

Facilitating Intra-Africa
Trade through Competent
Testing Solutions



MITI
Ministry of Investments,
Trade & Industry



KENAS
Delivering Trust

KENYA
ACCREDITATION
SERVICE



Future-Proof Labs by Design:
Mastering the fundamentals for
tomorrow's cutting-edge
innovations



Owen P. Fraser, PhD
Founder & CEO, Gobiosis

Why are we testing?



Standards

- Standards stipulate the quality acceptance criteria locally, regionally & internationally

Testing

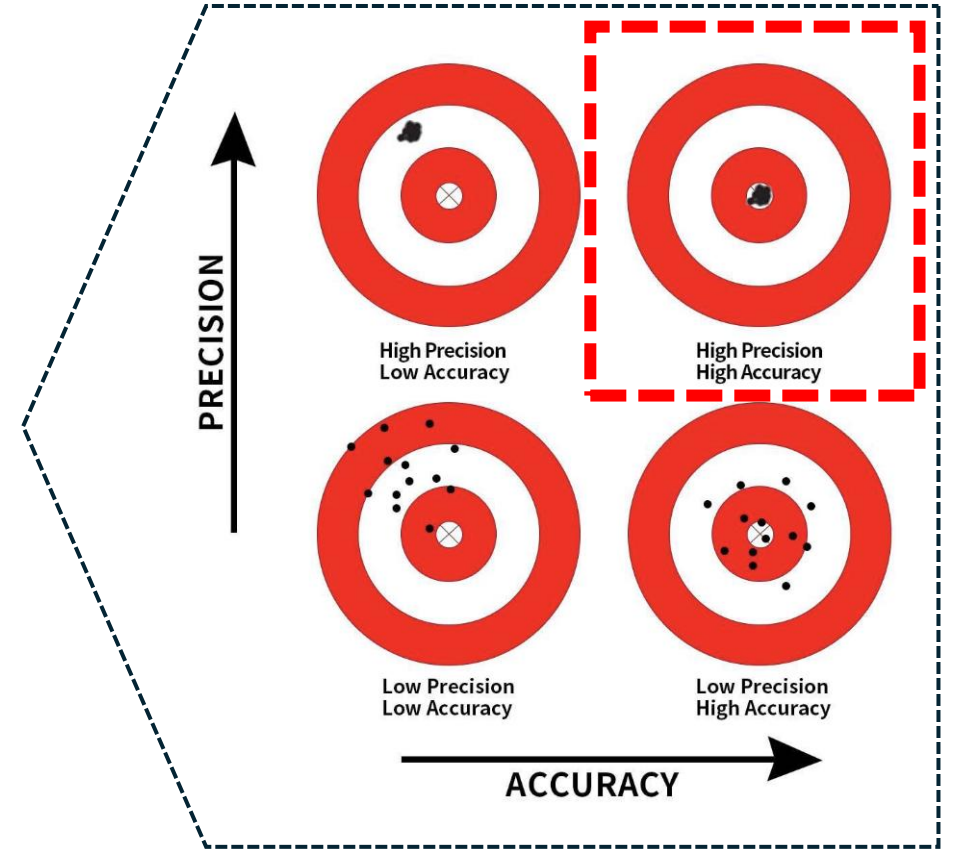
- Used to determine if the standard is being met
- The information obtained is also used to develop & implement improvement strategies.

Compliance

- Quality meet the required international standards commanding significantly higher price



- Access to high value market
- Safe foods
- Economic growth

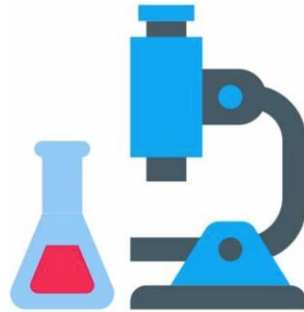


Key factors affecting the reliability of test results



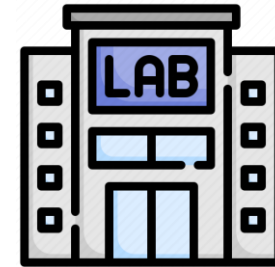
Competence

- Accuracy in Sample Handling
- Proficiency in Following Protocols
- Use of Equipment
- Attention to Detail
- Problem Solving and Troubleshooting
- Understanding of Quality Control (QC) Procedures
- Data Interpretation and Reporting:



Instrument

- Precision and Accuracy
- Calibration
- Sensitivity and Detection Limits
- Maintenance and Functionality
- Reproducibility
- Automation and Human Error Minimization
- Environmental Stability
- Software and Data Handling
- Appropriateness for the Test



Infrastructure

- Environmental Control
- Contamination Control
- Proper Ventilation and Safety Systems
- Electrical and Power Stability
- Layout and Workflow Design
- Access to Essential Utilities
- Data Management Systems
- Safety and Compliance
- Capacity for Regular Maintenance and Upgrades

What is a laboratory?

“a controlled environment where scientific research, experiments, and measurements are carried out”



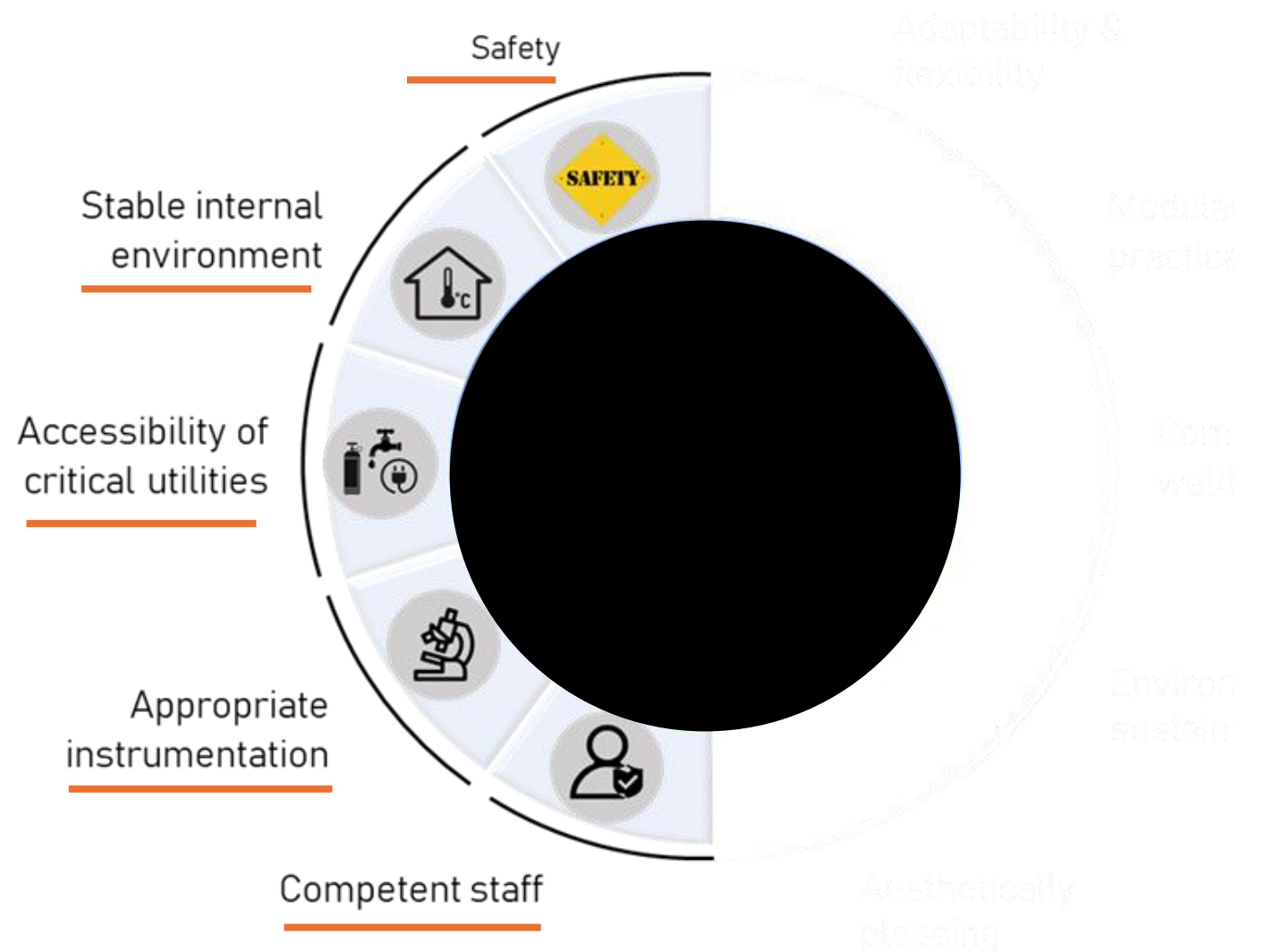
“a facility that provides controlled conditions in which scientific or technological research, experiments, and measurement may be performed”



“a building or room equipped for conducting scientific research or for teaching practical science laboratory”



The basic requirements



Are we mastering the basics?







Common Issues

- Poor safety
- Poor environmental control – temperature, humidity
- Poor building integrity
- Pest infestation
- Poor lighting
- Poor air handling – fume hood not functioning correctly
- Noisy
- Difficult to modify/ adapt to changing needs

The Impact



Unsafe working
environment



Unreliable results

How poor design
can introduce
sources of error



Independent air supply

Independent air supply

Independent fume hood
ventilation

Centrifuge

High precision analytical
balance

The AOAC Africa Laboratory Performance Benchmarking Program

By the AOAC Africa Scientific Committee

The AOAC Scientific Subcommittee members include: Yolande Ake-Assi, Augustus Babarinde, Talatu Ethan, Dr. Maria Fernandes-Whaley, Owen Fraser, PhD, Cheetham Lawrence Mingle, Ephram Moruke, Michael Ndlovu, Rosemary Njeri Nganga, and Dr. Liberty Sabanda

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-ABSTRACT-

AOAC AFRICA has done extensive work to establish the state of analytical capacity on the continent and to make practical remedial recommendations. The most recent iteration of its Laboratory Performance Benchmarking Survey (LPBS), in which 38 laboratories from eight countries participated in a series of six tests to assess the accuracy and reliability of the participating laboratories' results, revealed some concerning trends:

- Nearly half of laboratories testing for aflatoxins in peanut slurry did not pass.
- 75% of those testing for aflatoxin in maize did not pass.
- On average, up to half the testing for vitamins in fortified maize did not pass.
- Evidence of inappropriate result sharing between laboratories undergoing accreditation.

Keywords: Analytical capacity, Food safety, Aflatoxins, Laboratory performance benchmarking survey (LPBS), AOAC Africa, ARSO, Foodborne illnesses, Conformity assessment, African Continental Free Trade Area (AfCFTA)

Introduction

AOAC Africa Section has continued consolidating its emerging partnership with the African Organisation for Standardisation (ARSO) throughout 2023 to develop analytical methods suited to the continent's most widely consumed foodstuffs. At the same time, AOAC Africa—which represents the continent's analytical science community, working in conformity assessment and food safety laboratories all over the continent—has warned that a quantum leap in analytical capacity investment is needed if Africa is to resolve its food safety challenges and meet its food security need and international and continental agrifood trade ambitions.

Partners' Views

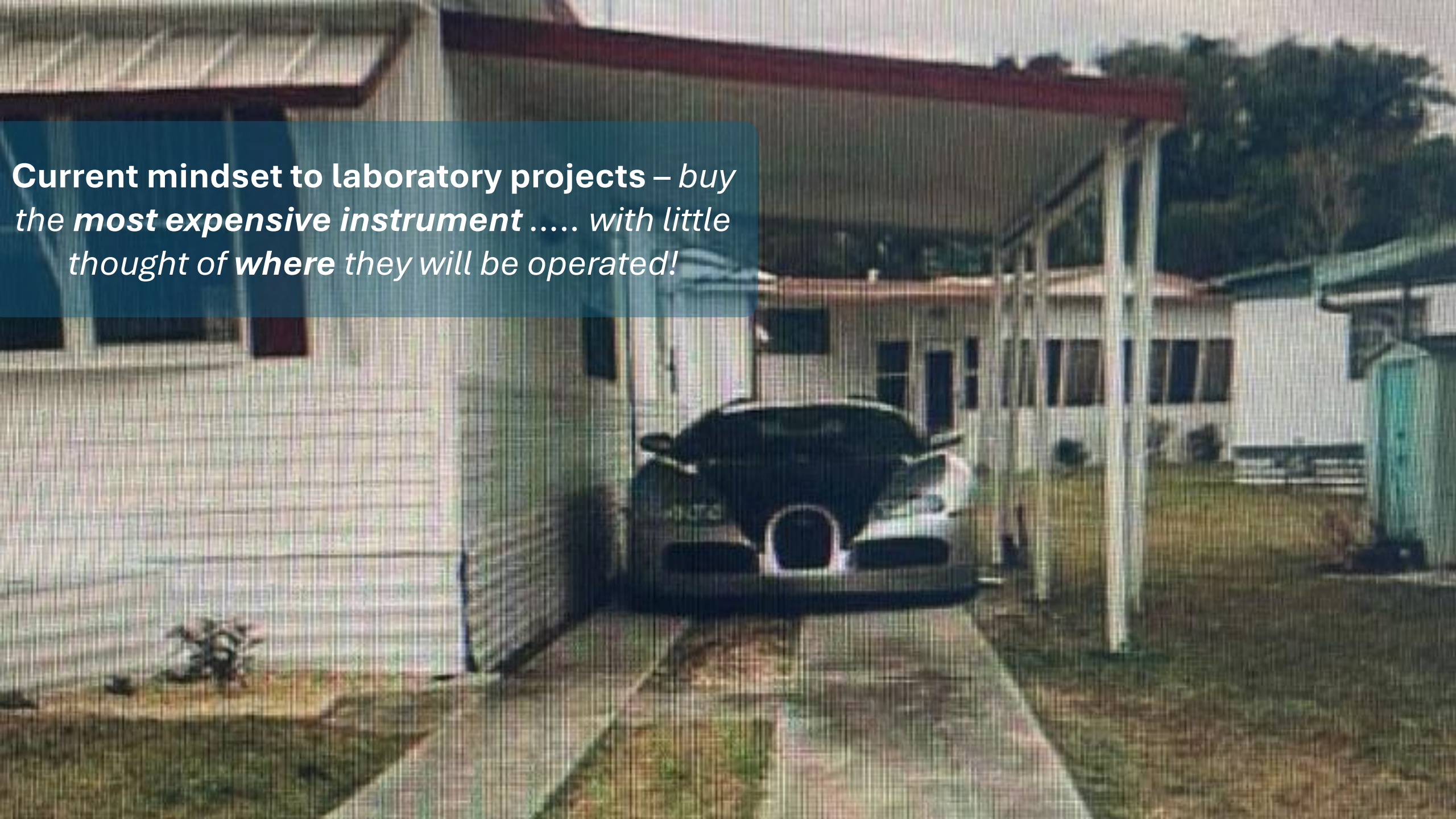
AOAC Section President Mrs. Winta Sintayehu described the ARSO partnership as a significant step in helping the continent achieve the objectives of the African Continental Free Trade Area. "It might seem hard to believe, but until recently, there were hardly any testing methods for the most commonly consumed African foodstuffs. This is especially concerning as the African Continental Free Trade Area (AfCFTA) really gathers pace, because the testing methods being used aren't designed for the specifics of African foods. As we end the African Union 2023 theme, 'Year of AfCFTA: Acceleration of the African Continental Free Trade Area Implementation,' we believe it's high time for action in this area, which is why we have been hard at work with ARSO on a method to test for contaminants and nutritional contents in cassava. The standards will improve the safety and quality of cassava and cassava products."

According to ARSO Secretary General Hermogene Nsengimana, the new method is a welcome development and will open the door to much-needed collaboration. "If we are going to test conformity in our indigenous foods reliably, we need testing methods that are fit for purpose, so that wherever we sell them—domestically, elsewhere in Africa, or beyond—we can be assured of their safety and quality. This way, African-developed analytical methods will ensure that African foods can compete for quality and nutritional value across the continent and across the world. This is a significant step on ARSO's path toward our goal of 'One Standard One Test Accepted Everywhere.' We are delighted with our collaboration with AOAC and believe this will be the first of many such testing methods specific to our staple African foods."

Continuing, Winta Sintayehu said, "AOAC Africa has a proven track record in capacity building programmes in recent years. This partnership with ARSO complements existing programmes with laboratories

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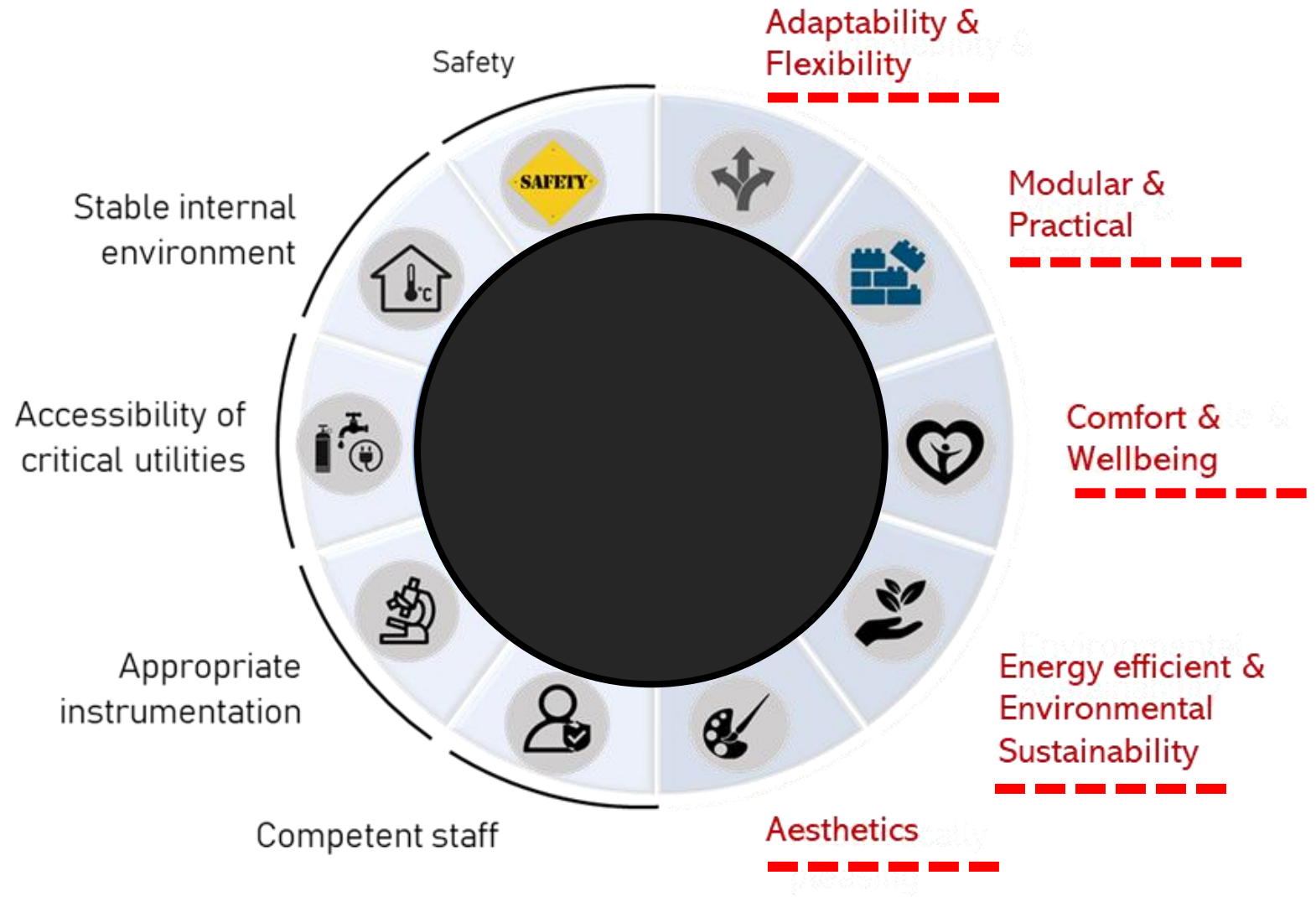
Current mindset to laboratory projects – *buy the most expensive instrument with little thought of **where they will be operated!***



Regardless of how expensive the instrument is
... **it will not work properly** and will get
damaged if the infrastructure is in **poor
condition** or is **poorly designed!**

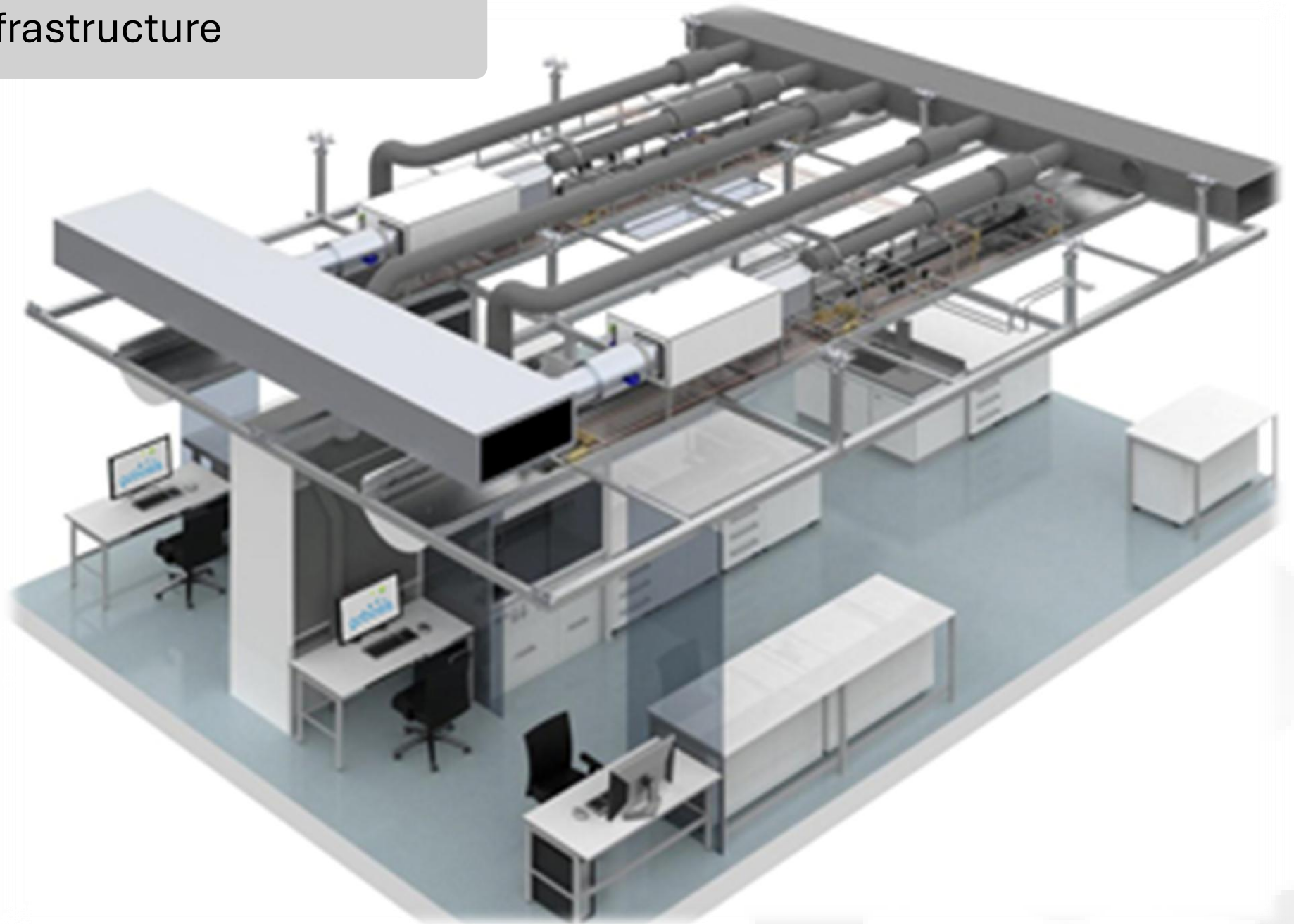


The modern laboratory



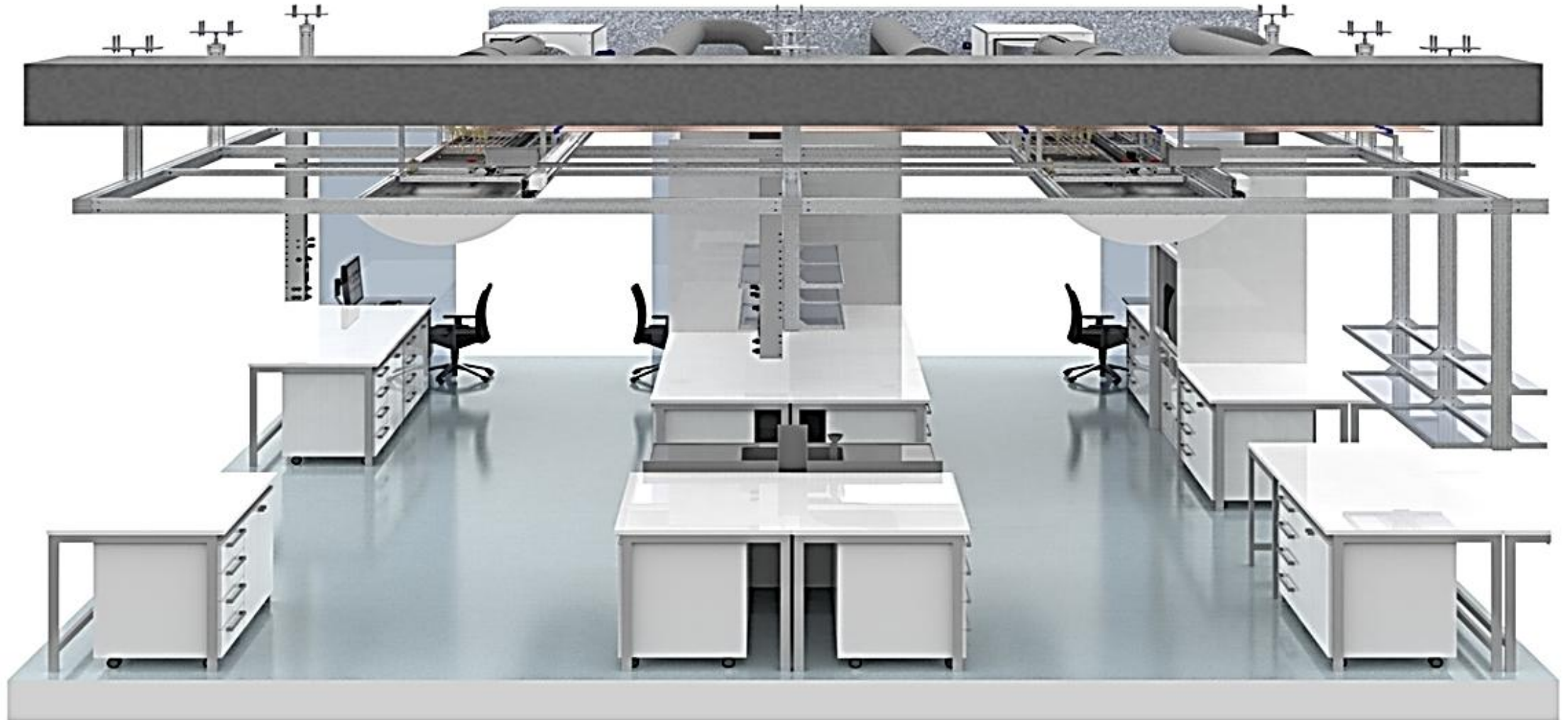
Smart Laboratory Infrastructure

Non-User specific, modular, scalable and environmentally sustainable laboratory design



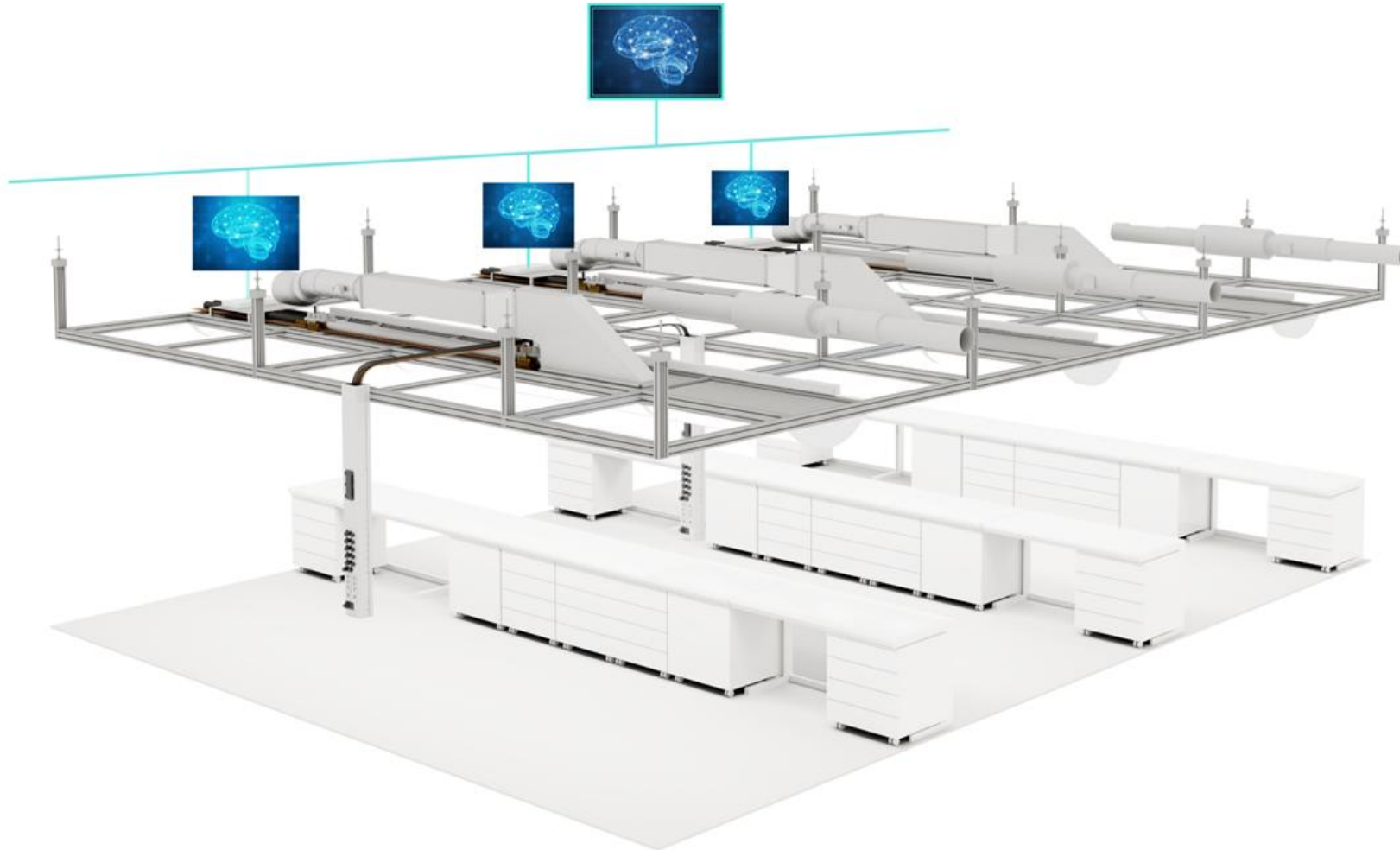
Standardised Infrastructure

Integrated services - power, HVAC, plumbing, lighting, etc. Maintaining environmental integrity and control, simplicity in design and ease of installation & maintenance



Smart Laboratory Infrastructure

Integrated laboratory design, resilient, sustainable and efficient energy solution, maintaining environmental integrity and control (HVAC systems), simplicity in design and ease of maintenance

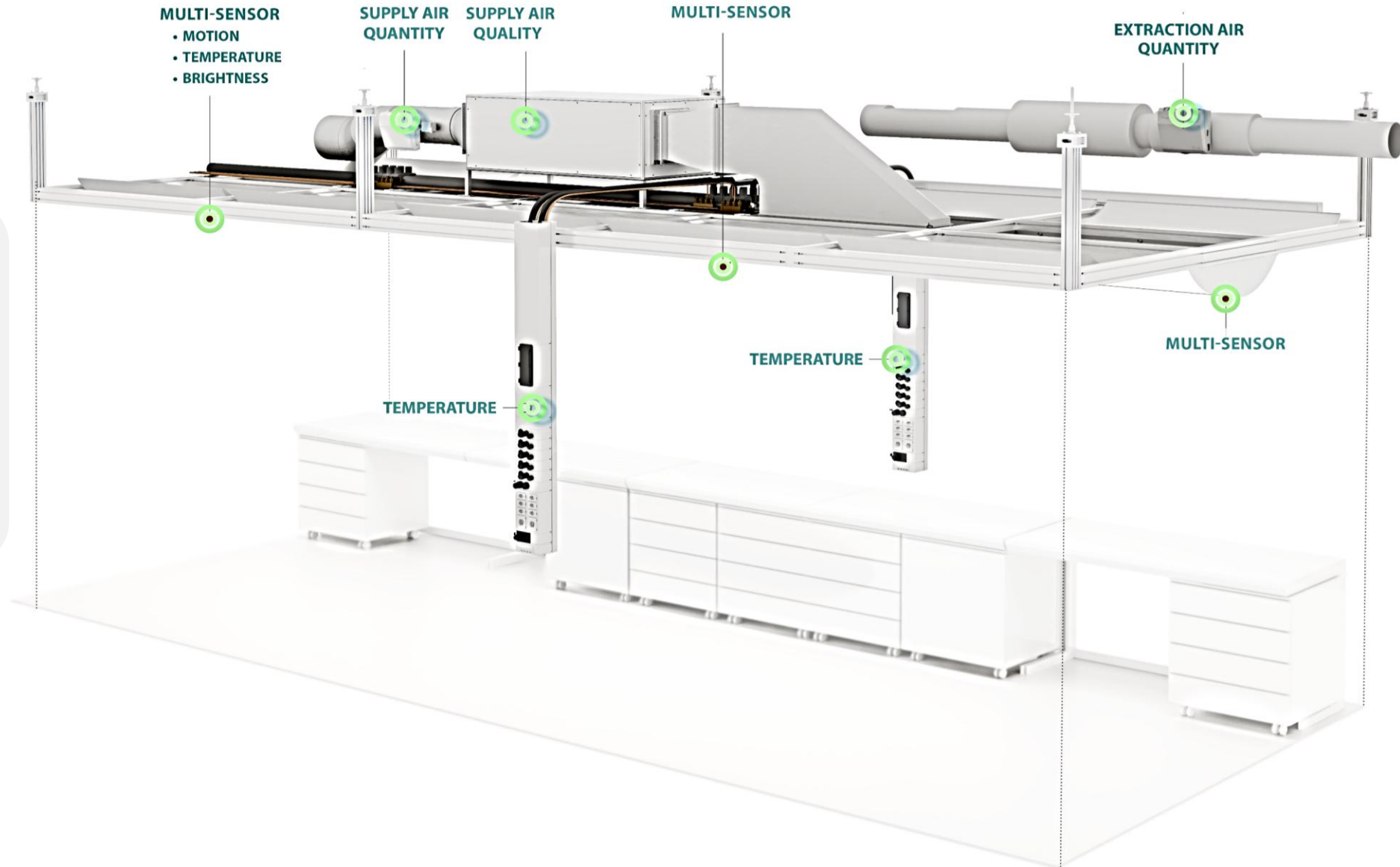


All data collected, analysed and managed by AI applications –
*optimising efficiency, improving safety,
and reducing cost of operation*

- SEGMENTS
- VAVs
- CLIMATE CONTROLS
- FUME HOODS
- POINT EXTRACTORS
- MEDIA CARRIERS
- Etc.

Adaptable Technical Platform for SMART Technology

Addition of smart sensor technology on top of smart infrastructure design – *enabling real-time monitoring of all parameters critical to quality, safety and comfort in the laboratory environment*



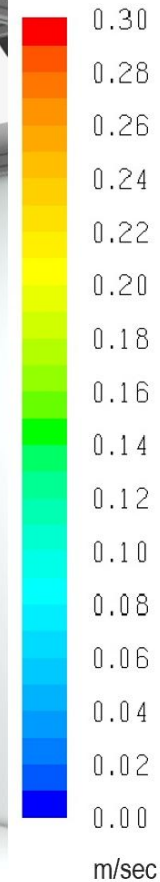
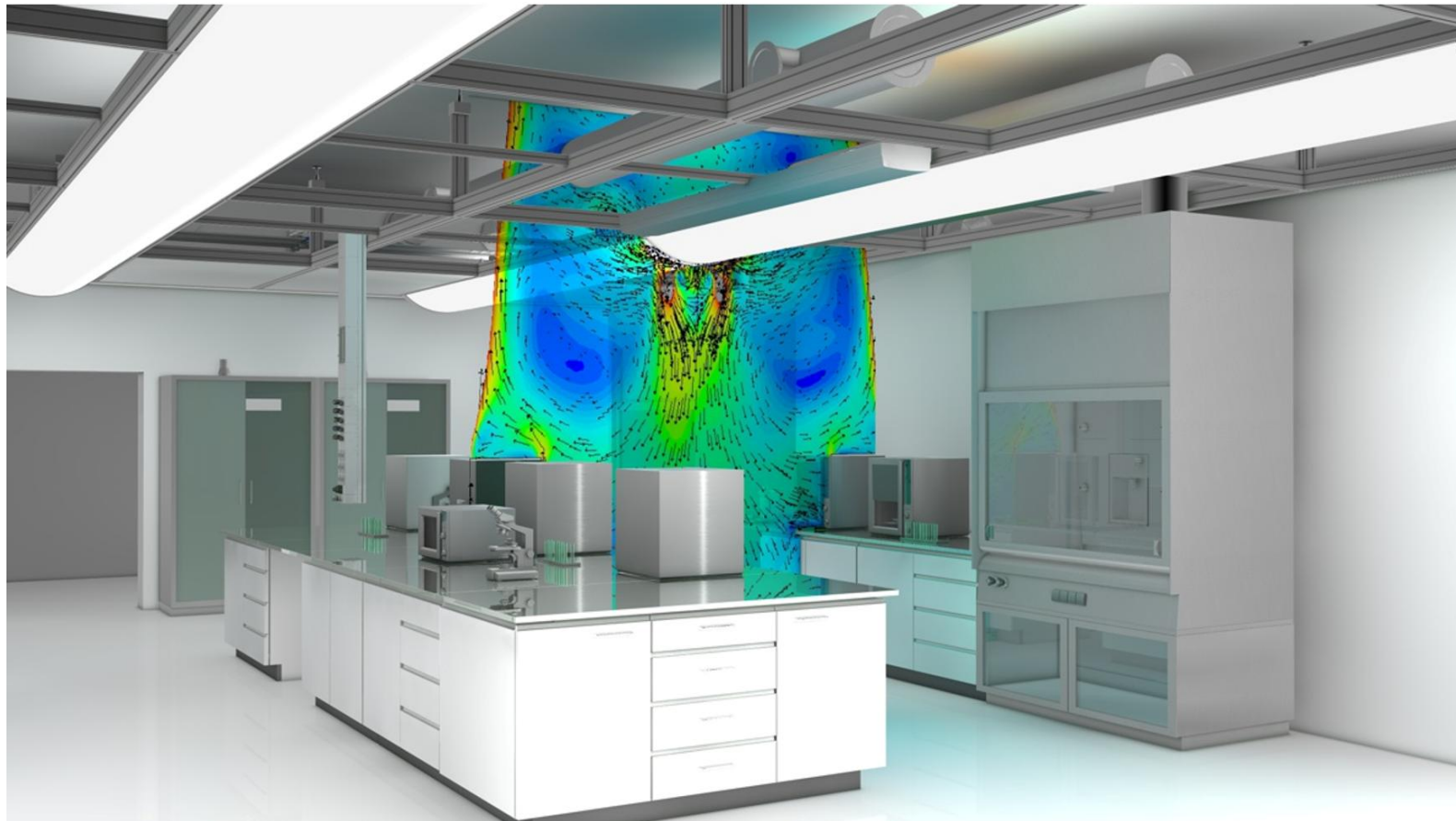
Integration of SMART lab furniture



All data collected, analysed and managed by AI applications –
*optimising efficiency, improving safety, and reducing cost of
operation*

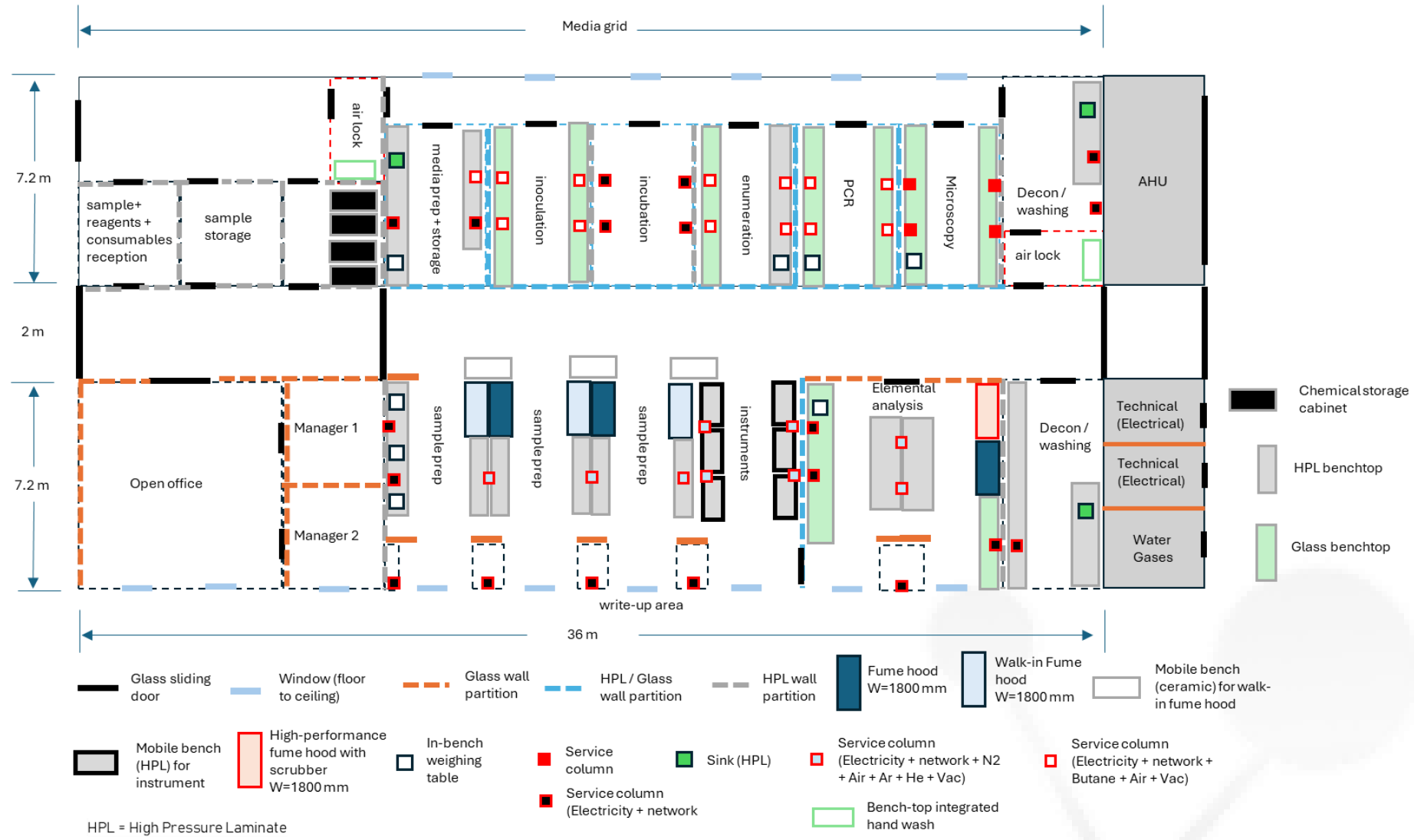
Understanding the smart Lab design

Integrated laboratory design, resilient, sustainable and efficient energy solution, maintaining environmental integrity and control (HVAC systems), simplicity in design and ease of maintenance



- 30% less exposure to airborne particles
- More than 40% improvement in energy efficiency

Basic laboratory plan based on scope of lab operation, optimizing space utilization

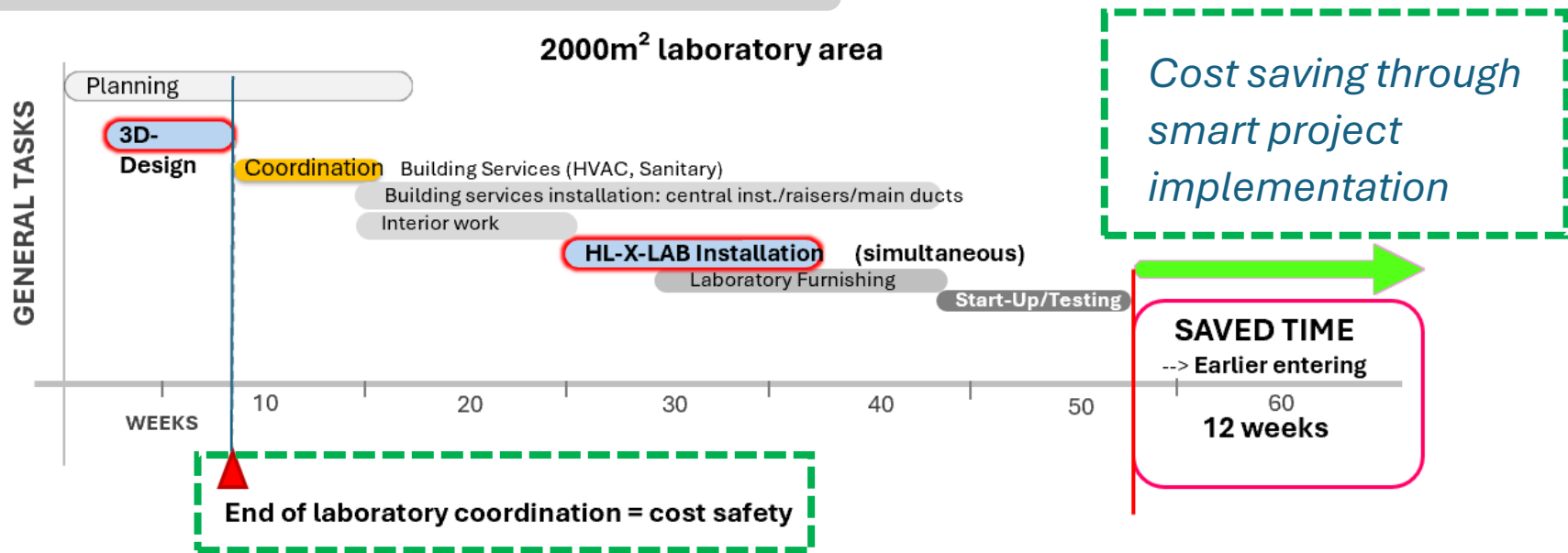


Complete smart design; Rapid
manufacturing installation;
Easy maintenance; Scalable &
Adaptable



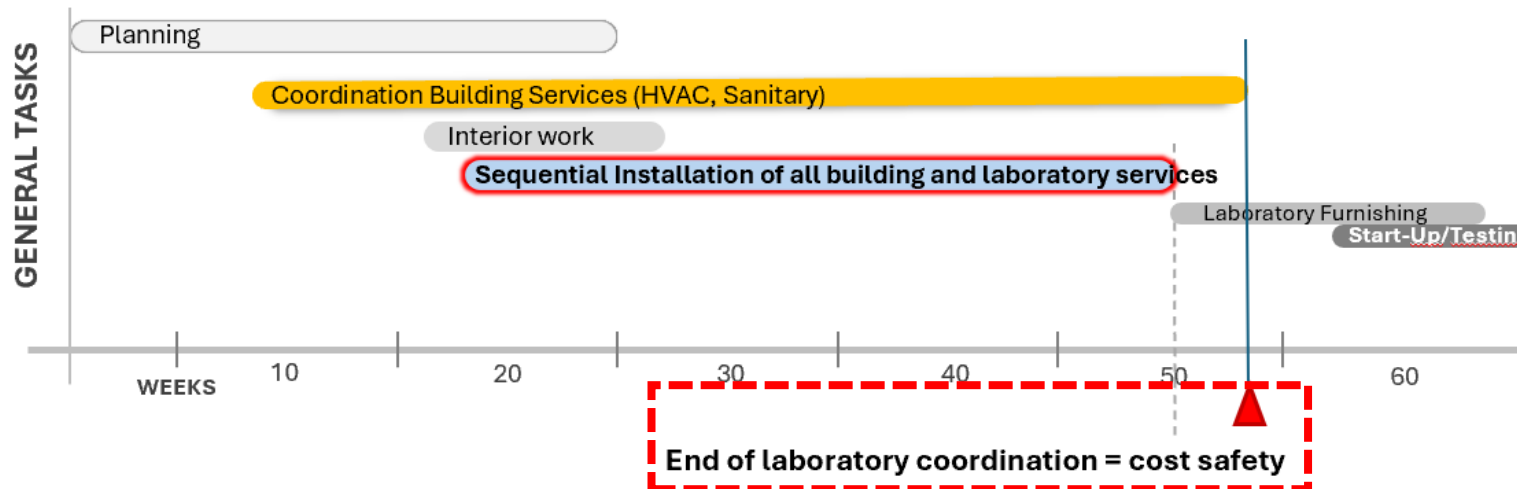
Benefit of SMART Lab Infrastructure Installation

SMART INSTALLATION



Efficient 3d-design, construction and installation saves time and costs

CONVENTIONAL INSTALLATION



Summarising the benefits of Smart Labs

Smart laboratory create a more innovative, agile, and efficient laboratory environment



Enhanced Safety: Automated safety protocols and monitoring help protect lab personnel and ensure compliance with safety regulations.



Increased Efficiency: Automation and streamlined workflows reduce manual tasks, saving time and allowing analysts to focus on more complex work.



Improved Accuracy: Automated processes and AI-driven analysis help minimize human error, leading to more reliable results.



Scalability: Smart labs can easily scale operations and integrate new technologies as needed, supporting growth and adaptability.

Summarising the benefits of Smart Labs

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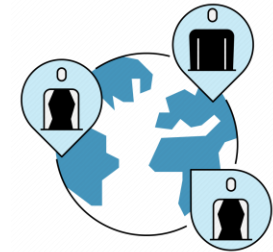
Cost Savings: Automation and optimized workflows lead to efficient use of resources, potentially reducing operational costs over time.



Enhanced Productivity: Advanced technologies and data management tools enable faster data processing and analysis, speeding up the research process.



Real-Time Monitoring: Continuous monitoring of lab conditions and equipment status ensures optimal experimental environments and allows for quick intervention if needed.



Remote Collaboration: Researchers can access data and control experiments remotely, facilitating global collaboration and teamwork.

Summarising the benefits of Smart Labs

Smart laboratory create a more innovative, agile, and efficient laboratory environment



Better Data Management: Secure cloud-based storage and advanced analytics tools provide organized, accessible, and interpretable data for research

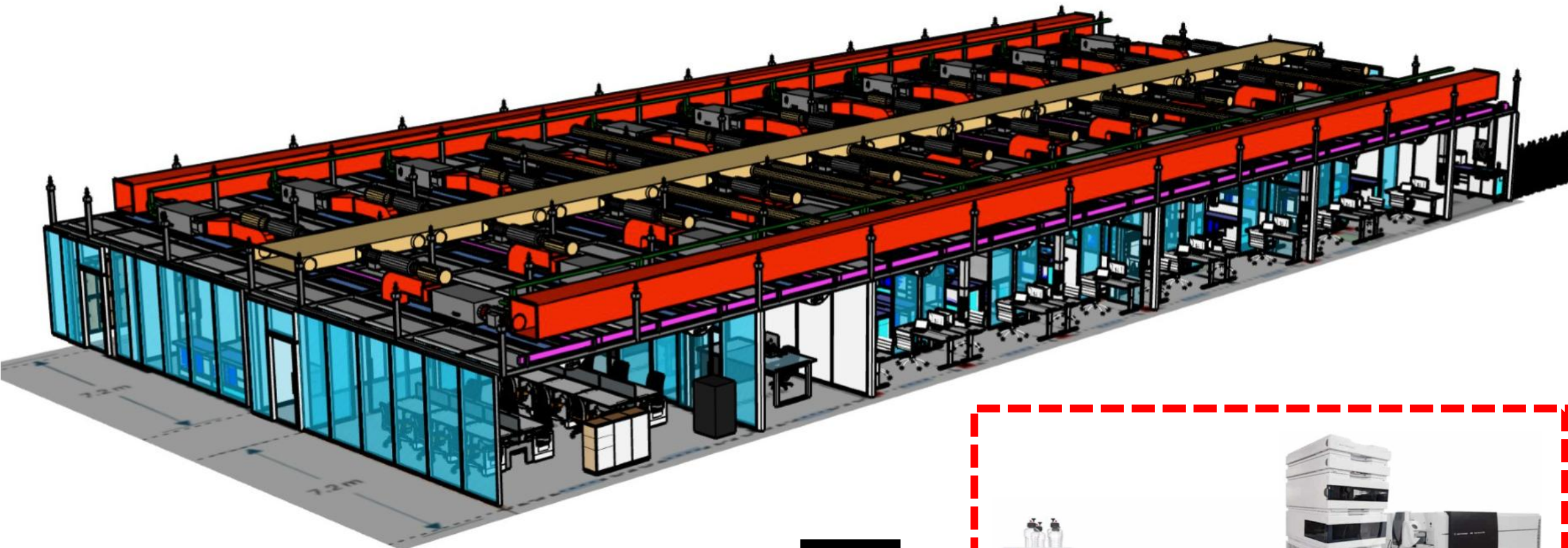


Improved Compliance: Digital tools help track and enforce regulatory compliance, reducing the risk of violations and associated penalties.



Integration with Other Systems: Smart labs often integrate with other systems, such as enterprise resource planning (ERP) and laboratory information management systems (LIMS), for seamless data flow and better decision-making

What does it cost?



=





CASE STUDY

Location – Johannesburg, SA
Lab floor area - 168 m²
Lab type - Chemistry





EMPTY SPACE (168 m²)
DAY 0



INSTALL FLOOR
DAY 5

A wide-angle shot of a modern laboratory. The room is brightly lit with natural light from large windows on the left. The lab benches are white with dark blue or black countertops. There are several biosafety cabinets with large glass windows. The ceiling is white with recessed lighting and track lighting. The floor is a light-colored, polished material. The overall aesthetic is clean, professional, and functional.

COMPLETE LAB
40 HOURS LATER

For more information about smart laboratory design, or to arrange a visit to our smart laboratory, please contact Dr Owen Fraser via:



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