

**TERMS OFf REFERENCE**

**and technical Specifications**

1. **General information**

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| Assignment name | **Mapping and Geographic Information System (GIS) Specialist** |
| Beneficiary | **African Union Commission** |
| Country | **Ethiopia** |
| Total estimated number of days | **(21 Days) implementation period** |

1. **Context and justification of the need**

Expertise France is a French public international cooperation agency. It designs and implements projects which aim to contribute to the balanced development of partner countries, in line with the Sustainable Development Goals (SDGs) of the 2030 Agenda and the priorities of France’s external action. Expertise France’s mission is to meet the demand of partner countries seeking to enhance the quality of their public policies in order to address the environmental, social, economic and security challenges they are facing. The agency achieves this goal by implementing projects in the main areas of public action:

- Democratic, economic and financial governance;

- Stability, international security and peace Stability, international security and peace

- Sustainable development, climate and agriculture

- Health and human development

In order to give substance to this dialogue and enshrine it in the long term and with a specific focus on the second theme of its declaration of intent, a total of EUR 2.75 Million in funding have been granted by the French Development Agency (AFD) to Expertise France in the form of a technical assistance and capacity-building facility to support the African Union (AU) on issues within its area of expertise. Based on a request from different departments from the African Union Commission (AUC), the French Facility for Technical Assistance to the African Union facilitated the conduct of a number of studies, strategy and policy papers aimed at supporting the AUC on topics related to economy and commerce.

**Development of a Map Presenting the Africa’s Strategic Transitional Critical Minerals:**

Africa possesses a substantial share of global reserves and production of Critical Minerals (CrMs) and Rare Earth Elements (REEs), many of which are indispensable for the advancement of Fourth Industrial Revolution (4IR) technologies. These include, but are not limited to, digitalization, automation, cyber-physical systems, the internet of things, cloud computing, robotics, artificial intelligence, and additive manufacturing.

The minerals’ mapping plays a crucial role in stimulating exploration and investment, ultimately leading to the discovery of new deposits and reserves. This, in turn, benefits African mining industries and economies by supporting the supply chains of 4IR technologies. Moreover, accurate and updated CrM and REE maps are essential for the effective implementation of the AU Agenda 2063, as many previous surveys predate the recognition of these minerals' critical role in 4IR technologies and emerging industries.

Recognizing the strategic importance of this project, the AUC, through the Department of Economic Development, Trade, Tourism, Industry and Minerals (ETTIM), has partnered with Expertise France. This collaboration aligns with the AU's continental strategies for developing and strengthening mineral and mining sectors, while also supporting Expertise France's mission to contribute to the balanced development of partner countries. This partnership involves the recruitment of a Mapping and GIS Specialist to design and develop an interactive online map presenting Africa’s Strategic Transitional Critical Minerals.

**Insights into the Development of the Interactive Map for Africa’s ASTCM Resources:**

This assignment, to be executed by a selected Mapping and Geographic Information Systems (GIS) Specialist, builds upon the first phase of the project, which was carried out by a Team Leader under a consultancy contract, and represents the final stage aimed at completing and operationalizing the strategic mapping of Africa's critical transitional minerals.[[1]](#footnote-1)

The First Phase included (i) a Baseline Assessment and Plan to address information gaps in mapping Africa’s Strategic Transitional Critical Minerals (ASTCM) essential for advancing 4IR/Industry 4.0 technologies, (ii) a Strategic Roadmap for designing and developing the Interactive and Dynamic ASTCM Map, and (iii) the Final Assembly and Data Integration for the Interactive Map of Africa’s ASTCM Resources.

A key component of the First Phase was the analysis of existing initiatives related to interactive and dynamic maps for Africa’s STCMs. This analysis helped identify synergies, avoid duplication, and ensure efficient resource use by aligning efforts across initiatives. Additionally, geological data gaps were identified and addressed to establish a solid foundation for the interactive map.

The designation "Africa’s Strategic Transitional Critical Minerals (ASTCM)" appropriately reflects the essential role these minerals play in Africa’s economic, industrial, and geopolitical landscape, aligning with global perspectives on resource criticality. The term “Strategic” highlights these minerals’ importance in securing technological advantages globally, “Transitional” underscores their role in the clean energy transition, and “Critical” signifies their irreplaceable role in modern technological advancements.

The designation "Interactive and Dynamic Map" is consistent with the assignment’s scope and objectives. It emphasizes the map’s interactive features, allowing users to explore detailed data on STCM deposits, while integrating GIS technology for data visualization and population. The “dynamic” aspect refers to the map’s ability to reflect updates based on new information, which will be inputted as mineral deposits are discovered, reserves change, or resource estimates are revised.

Incorporating Rare Earth Elements (REEs) into the project scope is a crucial enhancement, increasing the map’s relevance by reflecting their growing strategic importance in high-tech industries. REEs are vital to the advancement of Fourth Industrial Revolution (4IR) technologies, and their inclusion ensures the map comprehensively represents Africa’s critical mineral resources, reinforcing the continent’s role in the global technological landscape.

The rationale for creating an interactive, dynamic map lies in its ability to provide accurate geological data on mineral deposits. This data will enhance decision-making, improve transparency, support sustainable mining practices, bolster governance, and reduce investment risks. The map will facilitate Africa’s ability to capitalize on the growing demand for Strategic Transitional Critical Minerals (STCM) essential for the Fourth Industrial Revolution (4IR) while aiding the continent’s transition to Mining 4.0.

The map is intended to serve a wide range of users, including governments, private mining companies, transnational corporations (TNCs) in the mining industry, mine workers’ organizations, mining communities and indigenous groups, civil society organizations, academia, and financial institutions. Its design will enable the availability of up-to-date and accessible information, empowering stakeholders—both within and beyond the continent—to create informed policies that support decision-making and promote sustainable practices

During the first phase of its development, several key factors were carefully considered to ensure the map’s broad utility and effectiveness, including applicability, accuracy, comprehensiveness, relevance, reliability, and quality. These considerations are critical for ensuring that the map meets the needs of diverse users and supports its ultimate objectives.

As a result, the map’s goal is to assist in the development of new and existing STCM policies, focusing on three core areas: (i) ensuring supply reliability and resiliency, (ii) promoting exploration, production, and innovative local processing and manufacturing, and (iii) encouraging sustainable and responsible practices throughout supply chains.

Ultimately, the map’s development will support Africa’s industrialization and transition into a knowledge-based economy. By ensuring that STCM resources contribute to increased competitiveness, technological innovation, sustainable economic growth, and social progress, the map will play a critical role in driving Africa’s broader development goals.

By providing critical data on STCM resources, the map will support increased competitiveness, technological innovation, sustainable economic growth, and social progress, thereby playing a pivotal role in Africa’s industrialization and transition into a knowledge-based economy. It will contribute to the broader, long-term development vision outlined in Agenda 2063.

It is important to note that all research endeavours have limitations, which may affect the outcomes and conclusions. Recognizing these limitations is crucial to understanding the scope of the findings and identifying areas for future research.

Upon completion, the Interactive and Dynamic Map will provide reliable, up-to-date data that enhances strategic decision-making, supports policy planning, and advances Mining 4.0 in Africa’s resource-rich countries, contributing significantly to the global shift toward 4IR.

### **Key Functionalities and Features of the Interactive Map for Africa’s Strategic Transitional Critical Minerals (ASTCM)**

* **Interactive Mapping**: GIS-based visualization of mineral deposits (location, type, size, grade).
* **Data Integration**: Regular updates from geological surveys, academic publications, and industry sources.
* **Advanced Search/Filtering**: Search by mineral type, country, and production metrics.
* **Mobile Compatibility**: Accessible on mobile for field-based use.
* **Data Access and Download**: Ability to download mineral datasets for further analysis.
* **Statistical Integration**: Includes mineral production and market trends for informed decisions.

### Strategic Value

* **Stakeholder Engagement**: Encourages feedback from industry and government.
* **Private Sector Collaboration**: Supports transparent data sharing from mining companies.
* **Refined Search**: Advanced filtering for research and policy alignment.

### Policy Alignment & Sustainability

* **Compliance with Policy Frameworks**: Aligns with regional and global mining policies.
* **Government Data Sharing**: Facilitates collaboration while respecting sovereignty.
* **ESG Compliance**: Promotes responsible mineral resource management.

### Technological Integration

* **Continuous Data Updates**: Ensures the map evolves with new information.
* **Data Verification**: Combines reliable data sources for accuracy.

### Map Development Methodology

* **Mineral Classification**: Focus on minerals critical for Industry 4.0 (e.g., rare earth elements, lithium).
* **Mapping Criteria**: Prioritizes minerals based on economic and strategic importance.
* **GIS Technology**: Creates dynamic, interactive visualizations for detailed exploration.

1. **Objectives and desired results**
   1. **General objective**

This project builds upon existing global initiatives in mineral mapping and a developed Conceptual Farmwork on developing and designing the Africa’s Strategic Transitional Critical Minerals which was commissioned by the African Union Commission and Expertise France. The Conceptual Framework entailed a comprehensive review of existing mapping initiatives, geological data sources, operationalized maps, interactive platforms, and datasets combining GIS with interactive tools and real-time data. The new work by the Mapping & GIS Specialist will inform the development of the Africa’s Strategic Transitional Critical Minerals Map, including the identification and geographical distribution of mineral resources in the continent.

Furthermore, the Conceptual Framework recognizes the transformative power of digital tools, particularly Geospatial Information Systems (GIS) and remote sensing, in mineral exploration and development. These technologies are crucial for precise mineral resource identification, assessing extraction potential, and supporting environmental monitoring and sustainability. GIS tools integrate data from various sources to map mineral deposits, mining sites, and production areas, with a focus on minerals essential for 4IR and clean energy technologies.

* 1. **Specific objectives**

In this context, the scope of the work of the Mapping and GIS Specialist will focus on the following:

1. To design and develop an interactive online map of Africa’s Strategic Transitional Critical Minerals for the promotion of the Fourth Industrial Revolution (4IR).
2. To enhance the understanding of the distribution and potential of critical minerals resources across the African continent.
3. To support the implementation of the AU Agenda 2063 and the African Union Commodity Strategy by providing valuable data and insights on critical mineral resources.
4. To contribute to the development of sustainable and inclusive mining sectors in Africa.
5. To align with the African Knowledge Sharing Platform (AKSP) by promoting the discoverability and accessibility of scientific knowledge related to African mineral resources.
   1. **Scope of Work**

The Mapping and GIS Specialist will be responsible for:

1. **Data Collection and Analysis:**
   * Gathering, compiling, and analyzing existing data on critical mineral resources in Africa from various sources, including geological surveys, academic publications, and government reports (The Conceptual Framework Report will be the main reference).
   * Identifying data gaps and prioritizing data collection needs when deemed appropriate.
   * Assess the availability and quality of existing data presented on the Conceptual Framework’s report for the designing and developing an Africa’s Strategic Transitional Critical Minerals.
2. **Map Development and Design:**
   * Designing and developing an interactive online map using GIS software (e.g., ArcGIS, QGIS).
   * Incorporating relevant data layers, such as geological maps, mineral deposit locations, infrastructure, and socio-economic data.
   * Ensuring the map is user-friendly, visually appealing, and accessible to a wide range of users.
   * Developing interactive features, such as zoom capabilities, data filtering, and downloadable data.
3. **Data Validation and Quality Control:**
   * Ensuring the accuracy and reliability of all data used in the map development process.
   * Conducting quality control checks at various stages of the project.
4. **Documentation and Reporting:**
   * Preparing comprehensive project documentation, including methodologies, data sources, and analysis results.
   * Developing a user manual for the interactive map.
   * Presenting project findings and map outputs to the African Union Commission for validation.
5. **Description of the assignment**
   1. **Anticipated deliverables**
6. A project inception report summarizing the methodologies, data sources, analysis results, and key findings from the Conceptual Framework’s report.
7. A user manual for the interactive map.
8. A comprehensive interactive online map of Africa’s Strategic Transitional Critical Minerals.
9. Presentations on project progress and outputs to the African Union Commission.

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| **Content (reporting)** | **Time of submission** |
| A project inception report summarizing the methodologies, data sources, analysis results, and key findings from the Conceptual Framework’s report. | To be submitted within **5 working days** of signing the contract. |
| A user manual for the interactive map presenting the Africa’s Strategic Transitional Critical Minerals | To be submitted within **10 working days** of signing the contract |
| A comprehensive interactive online map of Africa’s Strategic Transitional Critical Minerals | To be submitted after **15working days** |
| Presentations on project progress and outputs to the African Union Commission. | To be presented after **18 working days.** |
| Incorporating the AUC’s comments on the interactive map and support the Commission in launching the interactive map online. | No later than **3 months** following the signature of the contract. |

* 1. **Submission and approval of reports**

Electronic versions of the Interactive map on the Africa’s Strategic Transitional Critical Minerals referred to above must be submitted to the Coordinator of the French-AU Technical Facility and AUC Division of Industry, Minerals and Innovation. The coordinator is responsible for having the report approved. The AUC (ETTIM Department) will be involved in commenting on and approving the reports associated to the development and launching the online interactive map of Africa’s Strategic Transitional Critical Minerals.

* 1. **Language requirement**

Proficiency in one of the African Union working languages is required. Proficiency in two or more other working languages is highly desirable

* 1. **Evaluation criteria**

Interested candidates must provide information demonstrating that she/he has the required qualifications and relevant experience to perform the services. Consulting firms may propose individual consultant/s, but only the experience and qualifications of individuals shall be used in the selection process, and that his or her corporate experience shall not be considered, and the contract would be signed with the proposed individual. Interested candidates are requested to submit their CV together with the copies of their diploma, employment certificates and possibly the references.

* 1. **Coordination**
* **Point of Contact:** Mr. Kervin Kumapley, Project Coordinator of the Expertise France AU Facility. He can be reached at [kervin.kumapley@expertisefrance.fr](mailto:kervin.kumapley@expertisefrance.fr).
* The Mapping and GIS Specialist will work in close collaboration with and under the guidance of the Team Leader responsible for developing the Conceptual Framework for the Africa Interactive Map of Strategic Transition Critical Minerals.
* The AUC's ETTIM Division of Industry, Minerals and Innovation retains full ownership of the interactive map, as mineral policy development falls exclusively within the mandate of the African Union Commission.

1. **Place, duration and terms of performance**

* Implementation period: From the date the contract is awarded to latest 3 months following the signature of the contract
* Start date: from the date the contract is awarded (early March 2025)
* Latest end date: 3 months following the signature of the contract
* Mission location: The mission is home based.

1. **Number of Experts Required**

* Number of experts: 1

1. **Profile of the Expert the Mapping & GIS Specialist**

* ***Major duties and responsibilities:***

The selected Mapping and Geographic Information Systems (GIS) Specialist shall be able to use the Information and Communications Technology (ICT) Tools to capture, store, manipulate, analyze, manage and present all types of geographical data including spatial and attribute data that reflects the **Africa’s Strategic Transitional Critical Minerals.** The Specialist shall technically design and set-up the interactive Map and related domain on a dynamic geographical map.

Among other parts, the Interactive geographical African Continental Map provide the followings: (i) Drop-down menu which allows users to access and download data from a given country; (ii) Resources page on Africa’s Strategic Transitional Critical Minerals ; (iii) Links to key continental and global policies, initiatives and strategies ; (iv) Download function for accessible data; (v) Site search functionality with relevant filters (country, document type, etc.); (vi) Information page providing details on the Map and key partners and (vii) Standard pages such as About Us, Privacy Policy and Contact Us.

***Qualifications and skills:***

1. Licensed Mapping and GIS Specialist with a high level of skill in geographical data analysis, mapping, and databases management. Additionally, the specialist should have experience in ICT and storing background in scripting.
2. Ability to build and maintain GIS databases and utilize the GIS software to analyze the spatial and non-spatial information in the databases.
3. Ability to analyze data and create maps and also able to design and participate in the launching and supporting of online maps for public consumption.
4. Demonstrate computer proficiency and profound knowledge in several programming languages like Python or ArcObjects which are also used in desktop mapping in order to automate process or develop customized tools and workflows.
5. He/she is also required to possess certain skills such as analytical thinking, interpersonal and communication skills, ability to pay particular attention to details, good time management skills, and several other skills.
6. Fluency in English. Other languages (French, Portuguese, Arabic and Spanish) is an advantage.

***Professional Experience & Academic qualifications.***

1. A Minimum of a bachelor’s degree in disciplines such as Computer Science, Geography, or Engineering, or in another related field is required.
2. Minimum of 10 years of proven professional work experience.
3. Previous work in capturing, storing, manipulating, analyzing, managing and presenting all types of geographical data including spatial and attribute data that are reflected in a Geographical Map.
4. **Budget**

The expert will submit their daily rate fees.

1. The Geographic Information Systems (GIS) Specialist will actively engage and collaborate with the Team Leader as needed, leveraging their expertise and ensuring alignment across relevant aspects of the project [↑](#footnote-ref-1)