FEDERAL GOVERNMENT OF SOMALIA

MINISTRY OF COMMUNICATIONS AND TECHNOLOGY (MOCT)

EASTERN AFRICA REGIONAL DIGITAL INTEGRATION PROJECT (P176181)

TERMS OF REFERENCE FOR THE TECHNICAL FEASIBILITY STUDY ON THE FIBER OPTIC BACKBONE, SERVICE REQUIREMENTS, AND IDENTIFICATION OF MARKET GAPS

FIRM CONSULTANCY

A. BACKGROUND

The Federal Republic of Somalia, located on the coast of the Horn of Africa, relies heavily on remittances and traditional livelihoods that are highly vulnerable to climate change. Somalia benefits substantially from foreign remittances, which are estimated to constitute upwards of 31.2 percent of the country's GDP. The livelihoods of roughly half of the Somali population of 16.3 million rely on pastoralism, with the livestock sector accounting for some 60 percent of GDP. Since 2019, the country has experienced devastating floods and drought, as well as locust infestations, which have left about 5.2 million people in need of humanitarian assistance and at risk of food insecurity. Poverty levels remain pervasive, with nearly 70 percent of Somalis living on less than US$1.90 a day in purchasing power parity terms.

In the absence of an integrated fiber optic backbone network, more than 70 percent of Somalia's population does not have access to broadband services. This prevents Somalia from benefiting from increased international capacity available via several new under-sea cables landing on its shores. It also limits Somalia from serving landlocked neighbors such as Ethiopia. Adoption of broadband services remains low in Somalia compared to regional peers. Mobile broadband penetration is estimated to be 15.4 percent. Important gaps in the value chain impact the quality of service, resulting in low speeds and high call drop rates. The fragmented market and lack of interconnection between operators is limiting network deployment outside of the major urban areas.

Through World Bank's support, 'The Eastern Africa Regional Digital Integration operation (EA-RDIP)' (2023-2028), $172 million is being prepared to address connectivity needs for countries in the Horn of Africa. The proposed program aims to advance the regional integration of digital markets Eastern Africa through supporting cross-border connectivity, harmonization of data and e-commerce regulations and policies, and removal of trade barriers, with the vision of establishing a Single Digital Market (SDM). Regional efforts to move towards an SDM is envisioned to have economic and welfare gains to all participating economies and will be especially beneficial for smaller economies, allowing them to tap into a larger regional market for economic expansion.

The project follows a regional series of projects (SOP) programmatic approach, including countries and regional economic communities (RECs) as key beneficiaries. A regional SOP approach is proposed as the progressive movement toward an integrated digital market in Eastern Africa will require initiative at both the country and regional levels. The first phase of the SOP will include two RECs —East Africa Community (EAC) and Intergovernmental Authority on Development (IGAD) which were selected based on their strategic significance in furthering digital integration, expansive geographic coverage in Eastern Africa and the Horn of Africa and overlapping mandates. SOP-I will also include two countries from Eastern Africa —Somalia and South Sudan which exhibit the lowest levels of digital development, enabling them to catch-up to their regional peers. It is envisioned that there will be multiple phases under the SOP to which countries will be able to join, based on their readiness and commitment to the broader SOP objective.

Within SOP-I, EA-RDIP will support the Federal Government of Somalia (FGS) through $80 million operation to establish digital connectivity and integrate with the regional digital market. The project has four components, as briefly described below:

- **Component 1.** Connectivity Market Development and Integration. This component will provide support to develop terrestrial cross-border connectivity and expand backbone and last-mile connectivity to rural and remote communities.
- **Component 2.** Data Market Development and Integration. This component will provide support to the integration and development of the data market, to enable secure exchange, storage and processing of data across borders, including strengthening the environment for cybersecurity.

- **Component 3.** Online Market Development and integration. This component will provide support to the integration and development of the online market, through targeted support for e-service enablers and digital skills.
- **Component 4.** Project Management and implementation. This component will provide technical assistance and capacity support for project preparation and implementation.

EA-RDIP in Somalia will be implemented by the Ministry of Communications and Technology (MoCT). A Project Implementation Unit PIU) will be set up at the MoCT which will be responsible for overall implementation, fiduciary, Environment and Social Framework (ESF) compliance for the project. The PIU will be supported with technical committees (TCs) bringing together key MDAs in the country, and also representation from federal member states (FMS). The PIU at MoCT together with the TCs are expected to report to a project steering committee (PSC) which will be established in the country. The PIU will also coordinate with the regional level PIUs at EAC, IGAD during implementation.

B. OBJECTIVES OF THE CONSULTANCY

The Federal Government of Somalia through the Ministry of Communications Technology (MoCT) will work to address the broadband infrastructure gaps of the country over the next five years. World Bank financing, under the Eastern Africa Regional Digital Integration Project (EA-RDIP) will be leveraged to catalyze private sector investment for this initiative. Preliminary priority routes have been identified, each of which will require close examination to develop technical specifications which will be included in the bidding documents. The Ministry also plans to assess market gap and universal access (UA) needs in case these can be bundled together with backbone infrastructure deployment during the tender process.

The objective of this assignment is to provide technical inputs to the open tender process for the deployment of the Fiber Optic Backbone infrastructure. **The consultants will be expected to work in parallel with another consulting firm working on the Commercial Transaction Manual (CTM) which will include the bidding document templates this consultancy would provide inputs to.**

Table 1: Roles of CTM, Technical Feasibility Study, and SRMC Consultancy firms

Project Phase	**Role/Task/Activity**	**CTM Consultancy**	**Technical Feasibility Study Consultancy**	**Security Risk Management Consultancy**
Phase 1	Industry consultation	Lead		
	Commercial Model formulation	Lead		
	Technical Specifications		Lead	
	Market gap/UA		Lead	
	Prepare Bidding document	Lead		
Phase 2	Site-specific Security assessment			Lead
	Support tender process	Lead		
	Supervision of deployment		Lead	
	Site-specific Security Monitoring and Advice			Lead

C. SCOPE OF THE ASSIGNMENT

The scope of this assignment will cover the following among others:

1. Develop a network design for fiber optic deployment:

a) Assess supply (current and under construction) based on the analysis of existing FOC (Fiber Optic Cables) of all telecom operators in the country (total length of FOC for each operator in the context of cities and villages); taking into account all existing and proposed telecommunications infrastructure built, in construction or planned by telecommunications companies, railroads, power, pipelines and other utilities, if any.

b) Develop annual forecasts of Internet end-user needs based on the assessment of future demand over the next 5-10 years. This will include:
   - an assessment of the geographical distribution of demand within the country; and
   - a breakdown between sources of demand (i.e., other operators, ISPs, international transit traffic etc.).

c) Determine the areas where new FOC construction is necessary, taking into account the justification based on population, distance from trunk optic lines, relief and other useful information for design and construction of FOC;

d) Conduct high-level design of new fiber optic backbone network links needed to address supply gaps, including new cross-border links;

e) Identify the list of locations where Points of Presence should be established and the service requirements in each location to meet the future demand (including IRU approach for long-term purchase of connectivity services); An assessment of the terminal equipment required for each fiber route, including shelter requirements, power requirements (e.g. solar power, wind power, existing district grid power supplies, and the associated accessories), terminal equipment, etc.;

f) To provide overview of network management system and center (NOC) to operate and maintain the network, including location, back up Network management equipment and location; and

g) To develop a detailed network design including network topology and structure, technology options, capacity requirements, functionality, number of fiber pairs, and fiber termination facilities, as well survey for FOC construction for selected areas.

2. Market Gap and UA Obligations:

a) Conduct a market gap analysis based on existing geographic definitions and priority routes confirmed above, and describe the current supply of infrastructure and services as well as the gaps;

b) Develop high-level coverage map at country and provincial levels;

c) Identify marginalized communities along the main fiber backbone routes that could be bundled in with the backbone deployment (i.e., camps for refugees/internally displaced people, specific rural or peri-urban communities, institutions such as universities, schools and healthcare facilities);

d) Estimate investment needs to close the gaps and identify those gaps that would require public financing;

e) Separately, estimate the cost of each of backbone-last mile bundles.

3. Develop Technical Specifications, Implementation Plan, and Supervision:

a) An individual assessment of priority routes within the network, including distance, complexity, terrain etc.

b) To develop the phased construction plan;

c) Development of mechanisms for sharing infrastructure with other service providers - such as electricity transmission companies, railways and telecom operators (IRU based agreement);

d) Development of Cybersecurity features for planned FOCs (hardware and software complex that meets international requirements);

e) To develop a total cost of the FOC construction including breakdown of costs for each phase of the developed construction plan;

f) To conduct a cost-benefit analysis of the proposed network based on the detailed budget estimation of the capital expenditures (CAPEX) associated with the construction of the recommended network design and equipment specifications. These figures should consider, routes survey, network design, equipment, transport and installation, network integration and commissioning, documentation, etc.;
g) To highlight possible commercial, legal, policy, and regulatory barriers for the FOC construction implementation and solutions for them; and
h) To prepare recommendations to detailed technical specifications, design of regulatory, licensing, and contractual arrangements and bidding documents necessary for bidding process;
i) Supervise the deployment of the fiber optic backbone in accordance with the technical design, specifications, and implementation plan.

D. DELIVERABLES AND TIMELINE

The duration of the assignment is expected to span the project cycle which ends in 2028 – an estimated 4 years.

Payment Schedule. *There will be two phases to the assignment. The first phase will consist of specific deliverables which will be paid in lump-sum. The second phase will consist of the tendering, implementation, and supervision process which will be a timed contract.* Following is the deliverable and payment schedule:

Table 2: Deliverables and Payment Schedule

Deliverable	Timeline	Payment
Inception Report	Within 1 week of contract signature	10% of contract
Interim output 1: Network design	Within 2 month of contract signature	30% of contract
Interim output 2: Market gap /UA assessment	Within 3 months of contract signature	20% of contract
Interim output 3: Draft technical feasibility study of priority routes	Within 5 months of contract signature	20% of contract
Final Report with network design, market gap/UA assessment, technical feasibility and recommendations	Within 8 months of contract signature	20% of contract
Supervision of network deployment	Timed contract	

E. GOVERNMENT AND CONSULTANCY'S RESPECTIVE RESPONSIBILITIES

The consultancy shall be contracted by the MoCT and will report to the PIU in the Ministry. The deliverables by the consultancy will be reviewed by the PIU. The consultancy must ensure that the tasks identified above are performed in a result-oriented manner with the objective of achieving outputs and outcomes expected from the assignment as has been described in the details above. Final report should (hard copy and electronic copy) approved by Head of the Project Steering Committee of MoCT and PIU. All outputs, reports, questionnaires and presentations shall be prepared in English. The consultancy is encouraged to utilize local expertise where appropriate. MoCT and National Communication Authority (NCA) shall provide the following to the consultancy firm:

- All available data and literature considered relevant for accomplishing identified tasks.
- Access to key officials within the relevant Ministries and other relevant official entities, including operator companies, regulators and/or any others as applicable.

- Ensure cooperation from other organizations, whose activities and programs may be considered relevant to this project, to enable the consultants to have access to the information necessary to carry out their work program.
- Guidance on the routes to be covered under the Feasibility Study, both middle-mile and (if relevant) last-mile (see Annex 1).
- Other logistical support, as necessary.

Status Meetings: The consultancy's team shall have monthly feedback sessions with the Ministry team in order to inform the team on progress made and more importantly, to use such meetings to identify and address any challenges that the consultant teams may encounter in the course of their assignment. Where necessary, the frequency of meetings may increase based on the urgency of matters to be discussed. All feedback meetings should be appropriately documented.

F. QUALIFICATION REQUIREMENTS FOR THE COMPANY:

The Ministry of Communications and Technology (MOCT) is seeking applications from firms and/or consortiums of consultants comprising at least telecommunications/ICT engineers and other relevant experts. The consultancy firm should have at least 5-year experience in providing similar consulting services. The firm should have experience in at least two (2) feasibility studies during last 5 years. The firm/consortium shall be required to undertake the assignment as a multidisciplinary team comprising of a lead consultant, key experts. The firm should have solid experience at the firm and individual level, including a local partner/consultant(s) to provide good local presence and understanding of digital ecosystem and local context as needed. The firm, lead consultant, and support consultant(s) should have a minimum of the following qualifications and experience:

The Team leader shall have:

- The Lead Consultant should have a Master's Degree in Telecommunications Engineering/ICT, Electrical Engineering, Electronics or related field;
- Established industry track record of not less than five (5) years in the field of Telecommunications and ICT;
- The Lead Consultant must be fully conversant and knowledgeable in the development of fiber optic solutions design, supervision and advisory - relevant experiences and expertise in developing ICT or the Telecommunication industry;
- Understanding of the legal and regulatory landscape of the country.

Optical Transmission Expert(s) shall have:

- The Key experts should have a degree in a field related to Telecom/IT Engineering or equivalent;
- Established track record for at least five (5) years of experience in transmission networks e.g CWDM/DWDM and SDH or equivalent;
- Key experts should have demonstrated experience in planning Telecom, IT networks, Fiber Optic Cable based on backbone and access networks;
- Must have at least five years' experience in design and configuration of optical transmission networks;
- Must have at least five years' experience with equipment and service configuration for multi-vendor environments;
- Transmission Vendors certifications are an added advantage.

IP Transmission Expert(s) shall have:

- The Key IP experts should have a degree in a field related to Telecom/ICT Engineering or equivalent;
- Established track record for at least five (5) years of experience in IP networks;
- Must demonstrated experience in planning Telecom, ICT networks, Fibre Optic Cable based on backbone and access networks;
- Should have demonstrated proficiency in AutoCAD, Google earth, GIS based systems or equivalent;
- Must have at least five years' experience in design and configuration of IP networks;
- Must have at least five years' experience with equipment and service configuration for multi-vendor environments;
- IP Vendor certification required.

Electrical Power expert(s) shall have:

- The Key experts should have a degree in Electrical Engineering. Masters' Degree in Power or Electrical Engineering or equivalent is desirable;
- Established track record for at least three (3) years of experience in renewable energy (Both Solar and Wind energy);
- Should have demonstrated experience in planning of power design for telecommunication installation;
- Must have at least five years' experience in design of power solutions;
- Relevant Certifications from EPRA or equivalent.

Telcom Technology Analyst/Designer(s) shall have:

- Degree in Telecommunications or Business or equivalent.
- Established track record of at least five (5) years of experience in development and establishment of sustainable telcom connectivity solutions to end-users

Economist/Financial/Business Expert(s) shall have:

- At least a Master's degree in economics, business or finance.
- Have relevant experience in telecommunications economics.
- At least 5 years of working on similar projects in similar assignments.
- Experience in business and financial modelling.

Legal Expert shave have:

- A law degree from an accredited university;
- Established track record of at least five (5) years of experience drafting business models and other business legal instruments including ICT regulations;
- Specific experience in the field of competition law or other relevant specialty;
- The ability to supplement personal experience by consulting specialists, as required, in fields such as technology, privacy, security, interconnection, spectrum management etc;
- Experience of working in post-conflict environments is desirable;
- Excellent communications skills.