COUNTRY: KENYA

PROJECT: KENYA DIGITAL ECONOMY ACCELERATION PROJECT (KDEAP)

IMPLEMENTING AGENCY: INFORMATION AND COMMUNICATIONS TECHNOLOGY AUTHORITY (ICTA)

PROJECT ID: P170941; CREDIT NUMBERS 7289-KE AND 7290-KE

TERMS OF REFERENCE

FOR

EXPRESSION OF INTEREST

FOR

CONSULTANCY SERVICES FOR DEVELOPMENT OF A NATIONAL MONITORING AND IMPLEMENTATION FRAMEWORK FOR SATELLITE AND NON-TERRESTRIAL TECHNOLOGIES

CONTRACT NO: KE-ICTA-580398-CS-QCBS

ISSUE DATE: 17TH NOVEMBER 2026

CLOSING DATE: 2ND DECEMBER 2026 AT 1000HRS EAT

Client:
The CEO,
ICT Authority
Teleposta Towers 12th Floor, Kenyatta Avenue
PO Box 27150 - 00100 Nairobi Kenya
Tel: +254 20 2089061/ 2211960 Fax: +254 20 2211960
Email: procurement@ict.go.ke , info@icta.go.ke
Website: www.icta.go.ke

1. BACKGROUND

The Communications Authority of Kenya is the regulator of the Information and Communications Technology (ICT) sector and was established under the Kenya Information and Communications Act (KICA), 1998, as amended. Its statutory mandates include managing radio frequency spectrum and satellite-orbit resources, licensing communications systems and services, type-approving communications equipment, protecting consumers and monitoring licensee compliance.

In addition to its regulatory mandate, the Authority plays an important role in supporting Kenya's digital transformation agenda, including through the Kenya Digital Economy Acceleration Project (KDEAP). KDEAP is a USD 390 million World Bank-funded initiative led by the ICT Authority to expand high-speed connectivity, strengthen the digital enabling environment and promote inclusive participation in the digital economy. Within this context, CA's capacity to effectively manage and monitor spectrum and emerging connectivity technologies is critical to ensuring that new technologies can contribute effectively to Kenya's connectivity and digital inclusion objectives.

Kenya's ICT sector is increasingly being shaped by satellite broadband and other non-terrestrial technologies. Satellite systems now support broadband access, enterprise connectivity, emergency communications, maritime and aviation services, Internet of Things applications, direct-to-device services and connectivity in areas where terrestrial infrastructure is limited or costly to deploy.

The growth of geostationary satellite systems and non-geostationary satellite constellations has created new connectivity opportunities while introducing increasingly complex regulatory and monitoring requirements. These systems involve complex frequency assignments, wide coverage beams, gateways, user terminals, earth stations, earth stations in motion and cross-border service footprints.

The Authority's existing spectrum monitoring capability provides an important foundation; however, terrestrial monitoring arrangements may not fully address satellite-specific requirements such as earth station verification, satellite downlink monitoring, uplink interference investigation, satellite carrier identification, antenna pointing, geolocation, beam coverage analysis, ESIM operations, NGSO gateway activity and international coordination cases.

The assignment will provide CA with an evidence base for determining the appropriate national satellite and NTN monitoring capability, including the required system architecture, technical components, institutional arrangements, human-resource requirements, training, costs, procurement approach, implementation roadmap and sustainability arrangements.

GLOSSARY

Term / Acronym	Definition
CA	Communications Authority of Kenya – the regulator of Kenya's ICT sector responsible, among other functions, for spectrum management, licensing, type approval and compliance monitoring.
CAPEX	Capital Expenditure – expenditure incurred on acquiring, establishing or upgrading long-term assets and infrastructure, including satellite monitoring equipment and facilities.
BSS	**Broadcasting Satellite Service** – a radiocommunication service in which signals transmitted by space stations are intended for direct reception by the general public.

Term / Acronym	Definition
BR IFIC	**International Frequency Information Circular** – a publication issued by the ITU Radiocommunication Bureau containing information relating to frequency assignments and associated regulatory and coordination processes.
D2D	**Direct-to-Device** – satellite-enabled connectivity that allows compatible mobile or other end-user devices to communicate directly with satellite systems without requiring a conventional terrestrial cellular connection.
ESIM	**Earth Stations in Motion**- earth stations communicating with satellites while in motion, including those operating on vehicles, vessels or aircraft, as applicable.
FSS	**Fixed Satellite Service** - a radiocommunication service between earth stations at specified fixed locations through one or more satellites.
GIS	**Geographic Information System** – a system for capturing, storing, analyzing, managing and visualizing geographically referenced data.
GSO	**Geostationary Satellite Orbit** – a geosynchronous orbit in which a satellite appears stationary relative to a fixed point on the Earth's surface.
HAPS	**High Altitude Platform Station** – a station located on an object at a specified altitude in the atmosphere, used to provide communications or other services.
IMT-NTN	**International Mobile Telecommunications Non-Terrestrial Networks** – the integration of non-terrestrial network components with IMT systems to extend mobile connectivity beyond conventional terrestrial networks.
IoT	**Internet of Things** – interconnected devices and systems capable of collecting, exchanging and processing data, including applications supported through satellite connectivity.
KDEAP	**Kenya Digital Economy Acceleration Project** – a USD 390 million World Bank-funded initiative led by the ICT Authority to expand high-speed connectivity, strengthen the digital enabling environment and promote inclusive participation in the digital economy.
MSS	**Mobile Satellite Service** – a radiocommunication service involving communication between mobile earth stations and one or more space stations, or between mobile earth stations through space stations.
NGSO	**Non-Geostationary Satellite Orbit** – satellite orbits in which satellites do not remain fixed relative to a point on the Earth's surface. NGSO systems may include constellations operating in low, medium or other non-geostationary orbits.
NTN	**Non-Terrestrial Network** – a network or network component that uses non-terrestrial platforms, such as satellites or high-altitude platforms, to provide connectivity or other communications services.
OPEX	**Operating Expenditure** – recurring expenditure required to operate, maintain and support the monitoring system and associated infrastructure.
RF	**Radio Frequency** – the range of electromagnetic frequencies used for radio communications and associated wireless applications.
VSAT	**Very Small Aperture Terminal** – a small satellite earth station typically used for two-way communications through a satellite network.
WRC	**World Radiocommunication Conference** – an ITU conference held periodically to review and revise, where necessary, the Radio Regulations governing the international use of the radio-frequency spectrum and satellite orbits.

Term / Acronym	Definition
Earth Station	A station located on, or within, the Earth's atmosphere intended for communication with one or more space stations or, in certain cases, other earth stations through satellite systems.
Gateway Earth Station	An earth station that provides the connection between a satellite network and terrestrial communications networks or services.
Geolocation	The process of determining the geographic location or source of a radio-frequency transmission, particularly for purposes of interference investigation and spectrum enforcement.
Interference	The effect of unwanted energy due to one or more emissions, radiation or inductions that degrades, obstructs or repeatedly interrupts a radiocommunication service.
Satellite Downlink	The radio frequency transmission path from a satellite or space station to an earth station or other receiving terminal.
Satellite Uplink	The radio frequency transmission path from an earth station or transmitting terminal to a satellite or space station.
Signal Identification	The process of determining the characteristics, source, type and relevant parameters of a detected radio frequency signal.
Direction Finding	A technique used to determine the direction or bearing from which a radio-frequency signal originates.
Harmful Interference	Interference that endangers the functioning of a radionavigation service or other safety services, or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with applicable regulations.
Satellite Monitoring	The systematic observation, measurement, identification, analysis and recording of satellite-related radio frequency activity to support spectrum management, licensing compliance, interference management, enforcement and regulatory coordination.
Spectrum Monitoring	The process of observing, measuring, identifying and analyzing radio-frequency use to support effective spectrum management, compliance, interference resolution and enforcement.

2. OBJECTIVE (S) OF THE ASSIGNMENT

General Objective

The general objective of the assignment is to develop a practical, implementable National Monitoring and Implementation Framework for Satellite and Non-Terrestrial Technologies in Kenya. This should include recommendations for a suitable monitoring system, technical components, institutional arrangements, cost estimates, an implementation roadmap and a sustainability model.

Specific Objectives

i. Assess Kenya's current satellite and Non-terrestrial technologies (NTN) regulatory, licensing, monitoring, compliance and institutional environment.
ii. Identify gaps in CA's current satellite and NTN monitoring capability, including technical, institutional, human-resource, data, operational and procedural gaps.

iii. Review relevant ITU Radio Regulations, ITU-R recommendations, BR IFIC processes and international best practice on satellite spectrum monitoring and interference resolution, including the outcomes of the upcoming ITU World Radiocommunication Conference (WRC).
iv. Assess and benchmark Kenya's applicable satellite and NTN license fees, spectrum fees and other relevant regulatory charges against comparable African countries and regulators, and provide recommendations on fee structures, cost drivers, affordability, competitiveness and sustainability, taking into account the different satellite and NTN service categories and applicable regulatory requirements.
v. Map satellite and NTN services relevant to Kenya, including GSO and NGSO systems for FSS, MSS, BSS, VSAT, gateway earth stations, ESIM, satellite IoT, HAPS, IMT-NTN and direct-to-device/cellular services.
vi. Evaluate monitoring system options and recommend the most suitable fixed, mobile, transportable, portable or hybrid model for Kenya.
vii. Define the required technical components, software, data systems, cybersecurity controls, GIS integration, calibration requirements, maintenance and support arrangements.
viii. Develop a costed implementation roadmap, procurement options, operational model, staffing structure and sustainability plan.
ix. Design and implement a structured training and knowledge-transfer programme for relevant CA staff.
x. Develop the final National Satellite and Non-Terrestrial Technologies Monitoring and Implementation Framework for adoption by CA.

3. SCOPE OF THE CONSULTING SERVICES AND SPECIFIC TASKS

i. Scope

The scope of this assignment is to undertake a comprehensive assessment and develop a National Satellite and Non-Terrestrial Technologies Monitoring and Implementation Framework for Kenya. The assignment shall cover regulatory, technical, operational, institutional, financial, human-resource, training, data, cybersecurity and implementation considerations.

The Consultant shall provide the evidence and technical specifications required for CA to make an informed decision on acquiring and implementing an appropriate monitoring capability; the consultancy shall not constitute equipment procurement or system implementation.

Scope area	Description
Regulatory review	Review satellite and NTN licensing, spectrum authorization, applicable license and spectrum fees, earth station authorization, type approval, enforcement and reporting requirements, and benchmark Kenya's fee structures against comparable African regulators.
Technical assessment	Assess monitoring of GSO and NGSO systems for FSS, MSS, BSS, VSAT, gateways, HAPS, IMT-NTN, ESIM and direct-to-device/cellular services.
System options	Compare fixed, transportable, vehicle-mounted, portable and hybrid monitoring models.
Technical specifications	Define antennas, receivers, analyzers, geolocation systems, signal identification tools, data storage, GIS integration and reporting dashboards.
Institutional arrangements	Recommend roles, workflows, staffing, training, escalation procedures and links with licensing and spectrum management systems.
Training and knowledge transfer	Conduct two training workshops during the project period each workshop will cover at least officers involved in spectrum management for satellite services.

Viability assessment	Evaluate technical feasibility, cost, benefits, OPEX, procurement options, risks and sustainability.
Implementation roadmap	Prepare phased implementation plan, budget ranges, procurement packages and priority actions.
Stakeholder Workshops	Convene 2 stakeholder workshops, (one for initial current-state assessment and second for validation of the draft framework)

ii. Key Tasks

a. Prepare an inception report confirming understanding of the assignment, methodology, work plan, data needs and stakeholder engagement approach.
b. Review Kenya's current satellite and NTN regulatory and monitoring environment.
c. Review CA's current spectrum monitoring capabilities and identify gaps related to satellite and NTN monitoring.
d. Analyze relevant ITU Radio Regulations procedures, BR IFIC processes, ITU-R recommendations and international best practice.
e. Map satellite and NTN services relevant to Kenya, including GSO and NGSO systems for FSS, MSS, BSS, VSAT, gateway earth stations, ESIM, satellite IoT, direct-to-device/cellular services, HAPS and IMT-NTN.
f. Assess monitoring needs for satellite downlinks, uplinks, earth station compliance, unauthorized transmissions, interference investigation and cross-border/regional issues.
g. Evaluate the need for fixed, mobile, transportable, portable or hybrid satellite monitoring capability.
h. Identify required hardware, software, antennas, geolocation tools, RF recording tools, GIS integration, databases and reporting dashboards.
i. Assess integration requirements with CA's spectrum management and monitoring enforcement systems.
j. Develop technical specifications for the recommended monitoring system and implementation model.
k. Prepare a phased implementation roadmap, cost estimates and sustainability plan.
l. Assess training, staffing, operations, maintenance and institutional arrangements.
m. Prepare risk analysis, mitigation measures and implementation dependencies.
n. Prepare the final National Satellite and Non-Terrestrial Technologies Monitoring and Implementation Framework.
o. Undertake a comparative benchmarking of satellite and NTN license fees, spectrum fees and other applicable regulatory charges across selected comparable African regulators, covering relevant service categories, fee structures, charging methodologies, one-off and recurring charges, spectrum-related fees and earth-station authorization fees, and identify lessons and options relevant to Kenya.

iii. General Tasks

a) Undertaking a National Satellite and Non-Terrestrial Technologies Monitoring Assessment

i. The Consultant shall undertake a comprehensive assessment of Kenya's satellite and NTN monitoring requirements, including the regulatory, technical, operational, institutional and human-resource dimensions.
ii. The Consultant shall review available licensing, spectrum assignment, earth-station, type-approval, interference and monitoring records and establish a baseline of current satellite and NTN operations relevant to CA.

iii. The Consultant shall assess satellite monitoring requirements across relevant services and frequency bands, including GSO and NGSO systems for FSS, MSS, BSS, VSAT, gateway earth stations, ESIM, HAPS, IMT-NTN, satellite IoT and direct-to-device/cellular services.
iv. The Consultant shall identify the information, data and monitoring evidence required to support licensing compliance, interference management, spectrum planning, enforcement and ITU coordination and notification processes.
v. The Consultant shall develop a gap analysis covering monitoring assets, technical capabilities, data, software, procedures, staffing, skills, cybersecurity, institutional arrangements and operational readiness.
vi. The Consultant shall prepare recommendations on the monitoring capability required by CA, including fixed, mobile, transportable, portable or hybrid options, with justification based on technical suitability, coverage, cost, scalability and sustainability.
vii. The Consultant shall develop a costed implementation roadmap and provide technical, procurement, training, operational and maintenance recommendations.

b) Development of the National Satellite and Non-Terrestrial Technologies Monitoring and Implementation Framework

i. The Consultant shall develop the National Satellite and NTN Monitoring and Implementation Framework based on the assessment findings and agreed recommendations.
ii. The framework shall define monitoring objectives, priority use cases, system architecture, technical specifications, data requirements, operating procedures, institutional roles and escalation arrangements.
iii. The framework shall address interference detection and investigation, earth-station verification, spectrum occupancy and carrier monitoring, geolocation, RF recording, satellite signal identification and evidence management.
iv. The framework shall provide a phased implementation approach, including priority capability, procurement packages, infrastructure requirements, integration requirements, training, staffing, operations and maintenance.
v. The Consultant shall develop a sustainability model addressing lifecycle costs, calibration, maintenance, software support, skills retention, cybersecurity, data governance and future technology upgrades.
vi. The Consultant shall validate the draft framework through stakeholder and technical consultation and incorporate agreed comments into the final framework.

iv. Specific Tasks

c) Monitoring Use Cases, Compliance and Interference Management Framework

The Consultant shall develop practical monitoring use cases and procedures for CA.

a. Earth-station and terminal verification.
b. Satellite downlink and uplink spectrum monitoring.
c. Unauthorized transmission detection.
d. Carrier identification and signal characterization.
e. Interference detection, investigation, geolocation, evidence capture and resolution.
f. Monitoring of ESIM and mobile/transportable earth stations.
g. NGSO gateway and constellation-related monitoring.
h. Support to ITU coordination, notification and harmful interference cases.
i. Cross-border and regional interference coordination.
j. Compliance reporting, case management and escalation.

d) Viability Criteria and Monitoring System Prioritization Framework

The Consultant shall develop objective criteria for determining the appropriate monitoring system configuration and implementation priority. The Consultant shall compare monitoring options based on technical suitability, coverage, frequency bands, mobility, cost, implementation complexity, maintenance needs, skills requirements, scalability and long-term value. The analysis should lead to a clear recommendation supported by evidence.

No.	Criteria	Indicative Considerations
1.	Technical suitability	Frequency coverage, sensitivity, accuracy, geolocation, tracking, monitoring use cases and interoperability.
2.	Operational suitability	Mobility, deployment time, staffing, accessibility, ease of use and response requirements.
3.	Coverage and strategic value	Geographic coverage, borders, strategic facilities, high-risk interference areas and service importance.
4.	Cost efficiency	CAPEX, OPEX, lifecycle cost, cost per monitoring capability and value for money.
5.	Scalability	Ability to support future GSO, NGSO, HAPS, IMT-NTN and D2D developments.
6.	Sustainability	Maintenance, calibration, software support, skills, power, cybersecurity and vendor dependence.
7.	Regulatory value	Support to licensing, enforcement, ITU processes, interference management and spectrum planning.
8.	Implementation risk	Procurement, site, security, technology, integration and institutional risks.

e) Costing and Financial Model

The Consultant shall develop a transparent costing model for the recommended monitoring capability.

i. Capital expenditure (CAPEX).
ii. Operating expenditure (OPEX).
iii. Lifecycle and replacement costs.
iv. Antenna, receiver and RF equipment costs.
v. Software licenses and subscriptions.
vi. Monitoring facility, power, communications and security costs.
vii. Integration, GIS, databases and cybersecurity costs.
viii. Calibration, maintenance and technical support costs.
ix. Training and knowledge-transfer costs.
x. Staffing and operational costs.
xi. Cost comparison of fixed, mobile, transportable, portable and hybrid options.
xii. Sensitivity analysis and phased implementation scenarios.

f) Emerging Technologies for Satellite and NTN Monitoring

The Consultant shall assess emerging technologies and their implications for Kenya's monitoring capability, including NGSO constellations, HAPS, IMT-NTN, direct-to-device satellite services, satellite IoT, software-defined monitoring, AI-assisted signal identification and geolocation, cloud-enabled monitoring and automated spectrum analytics.

No.	Assessment Area	Requirement
1.	Use case	Where the technology is relevant to monitoring requirements.
2.	Maturity	Whether the technology is commercially available or emerging.

3.	Cost	CAPEX, OPEX and lifecycle cost.
4.	Scalability	Ability to support future national deployment.
5.	Regulatory implications	Licensing, spectrum, coordination, compliance implications.
6.	Integration	Compatibility with CA's existing spectrum management and monitoring systems.
7.	Sustainability	Skills, maintenance, power, software and support requirements.
8.	Risks	Technical, commercial, legal, cybersecurity and operational risks.

v. Proposed Implementation Approach

The assignment shall be implemented in phases to allow early agreement on scope, evidence-based options analysis, structured technical review and management decision-making. The proposed approach is shown below, as a series of overlapping phases..

Phase	Main activities	Key outputs
Phase 1: Inception and mobilization	Kick-off, document request, stakeholder mapping and work plan confirmation.	Inception report and stakeholder engagement plan.
Phase 2: Current-state assessment	Review current regulatory, licensing, monitoring, enforcement, data and systems environment.	Diagnostic assessment and gap analysis.
Phase 3: Benchmarking and Options analysis	Review international practice and compare monitoring system options.	Benchmarking report and technical options report.
Phase 4: System design and viability assessment	Develop recommended architecture, components, costing, staffing and implementation roadmap.	Recommended system design and costed roadmap.
Phase 5: Framework development and validation	Prepare draft framework, conduct validation and revise.	Draft framework and validation report.
Phase 6: Finalization	Prepare final framework, implementation plan and management presentation.	Final framework and final presentation.

STAKEHOLDER ENGAGEMENT

The Consultant shall undertake structured stakeholder engagement to validate findings, collect information and build consensus. Stakeholders shall include CA departments responsible for spectrum, licensing, standards, legal, ICT, enforcement and related functions; relevant government ministries, departments and agencies; licensed satellite and telecommunications operators, and potential license owners; infrastructure providers in other market segments; development partners; academia; and other stakeholders authorized by CA. Relevant military and security agencies may also be engaged, where appropriate, for coordination and information-sharing purposes; however, military satellite applications and systems are excluded from the scope of the assessment.

Institution/role	Responsibility
Project Sponsor	Provide strategic direction, approve key deliverables and escalate policy or management issues.
CA Project Manager / Focal Point	Coordinate the assignment, organize meetings, manage document flow and track deliverables.
CA Technical Team	Review technical methodology, options, specifications, monitoring requirements and implementation roadmap.
CA Legal Team	Review procurement suitability, contractual requirements and legal/regulatory implications.

Consultant	Conduct the assignment, prepare deliverables, engage stakeholders and recommend the framework and monitoring system.
External stakeholders, where authorized	Provide relevant input on satellite/NTN services, interference issues and operational needs.

At least two (2) stakeholder/technical workshops shall form part of the assignment as shown below.

No.	Workshop	Nature/Purpose	Nature of Stakeholders	Indicative Timing
1.	Technical Requirements & Options Review Workshop	Review baseline findings, technical requirements, system options, architecture and integration needs.	CA/CIT	Weeks 7–10
2.	Framework Validation Workshop	Validate draft framework, technical recommendations, institutional arrangements, implementation and costing.	External/CA Internal/CIT	Weeks 17–19

DOWNSTREAM WORK

The outcomes of this assignment are expected to inform the planning, development and implementation of a national satellite and Non-Terrestrial Network (NTN) monitoring capability, including supporting the implementation of the recommendations. The inclusion of this provision does not constitute a commitment by the Authority to award any subsequent assignment to the Consultant.

TRAINING AND KNOWLEDGE TRANSFER

Training and knowledge transfer shall form an integral component of the assignment. The Consultant shall design and implement a structured capacity-building programme to strengthen CA's technical and institutional capacity to operate, manage, maintain and sustain satellite and NTN monitoring capability and to apply the framework and associated procedures.

The Consultant shall provide two (2) structured training sessions to CA Technical Staff combining classroom-based learning, practical hands-on exercises, demonstrations, user guidance, on-the-job coaching and mentoring.

No.	Training Session	Nature/Purpose	Indicative Timing
1.	Satellite/NTN and Spectrum Monitoring Fundamentals, Interference Investigation and Monitoring System Operations	GSO and NGSO systems for FSS/MSS/BSS, HAPS, IMT-NTN, D2D/C, spectrum monitoring, measurement techniques and interpretation of results.	Between weeks 10–16
		Antennas, receivers, analyzers, RF recording, signal identification, interference investigation, geolocation, evidence capture and case management.	
2.	Data, GIS, ITU Procedures and System Sustainability	GIS, monitoring data, dashboards, ITU procedures, cybersecurity, calibration, maintenance, SOPs and sustainability.	Weeks 25-26–32

Training

shall, at a minimum, cover satellite and NTN technologies; spectrum monitoring methodologies; interference investigation and geolocation; monitoring equipment operation; GIS and data analysis; ITU Radio Regulations and coordination procedures; cybersecurity and data governance; calibration and maintenance; operational procedures; and sustainability.

The Consultant shall prepare training agendas, participant manuals, presentations, practical exercises, assessment tools, attendance records and training reports. A consolidated Training and Knowledge Transfer Report shall document sessions delivered, materials, participant feedback, competency gaps and recommendations for continued capacity development.

SUSTAINABLE PROCUREMENT REQUIREMENTS

The Consultant shall execute the assignment in accordance with sustainable procurement principles, integrating environmental, social, economic and governance considerations into the planning and recommended acquisition of monitoring capability while ensuring value for money and minimizing adverse environmental and social impacts.

i. Consider lifecycle value rather than acquisition cost alone.
ii. Assess energy efficiency, renewable/backup power options and environmental considerations for monitoring facilities and equipment.
iii. Consider modular and upgradeable systems to reduce technology obsolescence and unnecessary replacement.
iv. Promote local skills development, knowledge transfer and maintainability.
v. Address cybersecurity, data protection and responsible data management.
vi. Consider supplier support, interoperability, open standards and avoidance of unnecessary vendor lock-in.

The Consultant shall declare any actual, potential or perceived conflict of interest, particularly in relation to satellite operators, telecommunications operators, spectrum equipment vendors, technology suppliers or entities that may benefit from the findings of the assignment. The Consultant shall maintain confidentiality of all regulatory, commercial, technical, spectrum, network and stakeholder information obtained during the assignment.

Technical Components to be Assessed

Component	**Purpose / issue to be assessed**
Antenna systems	Coverage of C, Ku, Ka, L, S and other relevant bands, antenna size, tracking, pointing accuracy and polarization.
Low-noise block converters / front-end systems	Reception sensitivity, stability, band coverage and calibration requirements.
Spectrum monitoring receivers and analyzers	Carrier detection, spectrum occupancy, bandwidth, power, modulation and signal quality measurements.
Satellite signal identification tools	Ability to identify carriers, transponders, satellites, services and anomalies.
Geolocation and interference localization	Capability to locate interference sources and support investigation.
RF recording and playback	Evidence preservation, analysis, dispute resolution and training.
Monitoring shelter/control room	Space, power, cooling, physical security and operational layout.

Power supply and backup	Grid, solar, battery, UPS and generator requirements for continuous operation.
Data storage and reporting dashboards	Secure storage, analytics, reporting, audit trails and management visibility.
GIS integration	Mapping of earth stations, interference cases, beams, site locations and monitoring results.
Cybersecurity controls	Access control, encryption, logs, backups, vulnerability management and incident response.
Calibration and maintenance tools	Accuracy, traceability, preventive maintenance and lifecycle support.

Quality assurance and reporting

The Consultant shall have an internal quality assurance mechanism to ensure that all reports, technical specifications, outputs, datasets, financial analyses and recommendations are accurate, evidence-based, internally consistent and suitable for decision-making.

METHODOLOGY

The consultant shall use a practical and evidence-based methodology. The approach should combine document review, technical assessment, stakeholder engagement, international benchmarking, market scan of monitoring systems, options analysis and validation with CA.

i. **Document and Regulatory Review:** The consultant shall review relevant regulations, license conditions, procedures, frequency assignment records, equipment type approval requirements and available internal operational documents. The review shall also cover the ITU Radio Regulations, BR IFIC, applicable ITU-R recommendations and international monitoring practices.

2. **Current-State Assessment:** The consultant shall assess CA's current satellite and related spectrum monitoring assets, staff capacity, workflows, data systems, reporting practices, interference complaint procedures and enforcement mechanisms. This should include identifying whether existing terrestrial monitoring systems can be integrated with satellite monitoring capability.

3. **Stakeholder Engagement:** The consultant shall engage relevant CA departments and, where authorized by CA, selected licensed operators, government agencies and technical stakeholders. The engagement shall focus on monitoring needs, operational gaps, data availability, interference issues, priority services and implementation constraints.

4. **International Benchmarking:** The consultant shall benchmark satellite monitoring arrangements in similar countries and regulatory agencies. The benchmarking should consider system architecture, operational models, procurement approaches, skills, maintenance arrangements and lessons relevant to Kenya.

4. DURATION AND LOCATION OF THE ASSIGNMENT

The consultancy shall be undertaken over a period of thirty-two (32) calendar weeks from the date of contract signature. The Consultant shall mobilize the proposed key personnel immediately upon commencement and execute the assignment in accordance with the approved Inception Report, work plan and implementation schedule. The Consultant shall ensure that all activities and deliverables are completed within the stipulated contract period while maintaining the highest standards of quality and professional practice.

5. REPORTING REQUIREMENTS AND TIMELINES FOR DELIVERABLES

The Consultant shall submit the following reports during the implementation of the assignment.

No.	Deliverable / Output	Sub-Tasks/Key Activities	Indicative Timeline for deliverables
1.	Inception Report and Work Plan	i. Inception meeting. ii. Review and confirm the objectives, scope, expected outputs and implementation approach. iii. Develop detailed methodology and work plan, including activities, milestones and responsibilities. iv. Develop data requirements and data collection/validation plan. v. Develop stakeholder mapping and engagement plan. vi. Develop risk management, quality assurance and reporting arrangements.	Weeks 1–2
2.	Baseline, Regulatory, Satellite and NTN Service Landscape and Monitoring Needs Assessment Report	i. Review relevant national policies, legislation, regulations, licensing frameworks and institutional arrangements. ii. Review applicable ITU Radio Regulations, recommendations, satellite coordination and notification procedures and other relevant international instruments. iii. Compile and validate available satellite, spectrum, licensing, earth-station, gateway and interference data. iv. Undertake a national satellite and NTN service landscape assessment. v. Assess GSO/NGSO systems for FSS, MSS, BSS, earth stations, gateways, ESIM, HAPS, satellite IoT, IMT-NTN and direct-to-device services relevant to Kenya. vi. Identify current and emerging satellite/NTN monitoring requirements and priority monitoring use cases. vii. Undertake stakeholder consultations to validate the baseline and identified monitoring needs. viii. Document the diagnostic assessment of the existing regulatory, licensing, monitoring and enforcement environment.	Weeks 3–10
3.	Current-State Monitoring Capability, Gap Analysis, GIS Mapping and International	i. Inventory and assess existing CA satellite and spectrum monitoring assets, systems, equipment and facilities. ii. Assess existing RF monitoring, interference detection, direction finding and geolocation capabilities. iii. Assess existing human resource, institutional, data and procedural capabilities.	Weeks 6–14

	Benchmarking Report	iv. Identify technical, institutional, operational, data and capacity gaps. v. Map existing and required monitoring locations and relevant satellite/earth-station infrastructure using GIS. vi. Undertake spatial analysis of monitoring coverage and identify priority areas/locations for monitoring capability enhancement. vii. Benchmark satellite and NTN monitoring approaches adopted by selected international and regional regulators/administrations. viii. Identify applicable lessons and good practices for Kenya. ix. Conduct the Technical Requirements and Options Workshop to validate the findings.	
4.	Technical Options, Recommended Monitoring System Architecture, Technical Specifications and Monitoring Procedures Report	i. Define detailed satellite and NTN monitoring use cases and functional requirements. ii. Develop criteria for assessing and prioritizing monitoring solutions. iii. Assess fixed, mobile, transportable, portable and hybrid monitoring options. iv. Assess monitoring antennas, receivers, spectrum analyzers, RF front-end systems, recording systems and associated equipment. v. Assess technical requirements for satellite signal detection, identification, interference investigation, direction finding and geolocation. vi. Develop and compare alternative system architectures. vii. Recommend the preferred monitoring system architecture and configuration and develop detailed technical specifications and integration requirements. viii. Develop monitoring, compliance and interference management procedures. ix. Define data, cybersecurity, interoperability and system management requirements. x. Conduct technical demonstrations/verifications where required.	Weeks 10–20
5.	Costing, Procurement, Implementation, Institutional, Sustainability and Capacity Building Report	i. Develop CAPEX and OPEX estimates for the recommended monitoring capability. ii. Undertake lifecycle cost assessment and financial/economic analysis. iii. Assess alternative procurement and implementation options. iv. Develop procurement packages and indicative procurement specifications. v. Develop a phased and costed implementation roadmap. vi. Define institutional roles and responsibilities for operation and management of monitoring capability. vii. Develop operations, maintenance, system upgrade and sustainability arrangements.	Weeks 16–24

		viii. Develop performance indicators and monitoring arrangements. ix. Identify human resource and competency requirements. x. Deliver two structured training and knowledge-transfer sessions covering satellite/NTN monitoring, spectrum/RF monitoring, interference investigation, system operation and relevant data/operational procedures. xi. Prepare training materials, practical exercises and knowledge-transfer documentation. xii. Conduct the Draft Framework Preparation/Technical Validation Workshop, as appropriate, to inform the Framework.	
6.	Draft and Final National Satellite and NTN Monitoring and Implementation Framework, Validation Report and Complete Handover Package	i. Consolidate findings from all technical assessments and stakeholder engagements. ii. Prepare the Draft National Satellite and NTN Monitoring and Implementation Framework. iii. Incorporate the recommended monitoring architecture, technical specifications, procedures, institutional arrangements, costing, implementation roadmap and sustainability measures. iv. Present the Draft Framework to CA Management and relevant stakeholders for review. v. Conduct the Draft Framework Validation Workshop and document stakeholder comments and recommendations. vi. Prepare the Validation Workshop Report and comments/responses matrix. vii. Revise the Framework and associated outputs based on agreed comments. viii. Prepare and submit the Final National Satellite and NTN Monitoring and Implementation Framework and Implementation Plan. ix. Conduct the Final Framework and Implementation Workshop and incorporate the agreed recommendations into the final deliverables	Weeks 24-32

The Communications Authority shall review each deliverable and provide consolidated comments within fifteen (15) working days of receipt. The Consultant shall address all comments and resubmit revised deliverables within ten (10) working days unless otherwise agreed.

All reports and outputs shall be submitted in the formats specified below.

Reports formats, timelines for deliverables

No.	Deliverable / Output	Hard Copy Requirement	Electronic Format	Submission Medium
1.	Inception Report and Work Plan	Two bound and signed hard copies	Word and PDF	Cloud link and flash disk/external drive
2.	Baseline, Regulatory, Satellite and NTN Service Landscape and	Two bound and signed hard copies	Word, PDF, Excel data inventory and supporting datasets	Cloud link and flash disk/external drive

	Monitoring Needs Assessment Report			
3.	Current-State Monitoring Capability, Gap Analysis, GIS Mapping and International Benchmarking Report	Two bound and signed hard copies, including relevant maps and summary tables	Word, PDF, GIS-compatible datasets, geodatabase, shapefiles/KML/KMZ and supporting analytical files.	Cloud link and flash disk/external drive
4.	Technical Options, Recommended Monitoring System Architecture, Technical Specifications and Monitoring Procedures Report	Two bound and signed hard copies, including technical drawings and specifications	Word, PDF, technical drawings, system architecture diagrams, equipment specifications, GIS files and supporting technical documentation.	Cloud link and flash disk/external drive
5.	Costing, Procurement, Implementation, Institutional, Sustainability and Capacity Building Report	Two bound and signed hard copies	Word, PDF, editable Excel costing and lifecycle models, procurement schedules, implementation roadmap, training materials and supporting documentation.	Cloud link and flash disk/external drive
6.	Draft and Final National Satellite and NTN Monitoring and Implementation Framework, Validation Report and Complete Handover Package	Draft: Two bound hard copies for review. Final: two bound and signed hard copies, including executive summary and supportin annexes	Final Word, PDF, PowerPoint, editable Excel models, GIS datasets and maps, technical specifications, monitoring procedures, training materials, validation/comments matrix and all supporting documentation.	Secure cloud link and labelled flash disk/external drive; dashboard/system URL where applicable

All draft and final reports (in specified formats and copies) shall be submitted in the prescribed format to:

The Director General/CEO Communications Authority of Kenya CA Centre, Waiyaki Way P O Box 14448-00800 NAIROBI, KENYA Tel: +254703042000 **Attn:** **The Director** Standards and Resource Management Communications Authority of Kenya CA Centre, Waiyaki Way P O Box 14448-00800 NAIROBI, KENYA Tel: +254703042000	The Chief Executive Officer ICT Authority Telposta Towers 12th Floor, Kenyatta Ave P O Box 27150-00100 NAIROBI, KENYA

6. PAYMENT SCHEDULE/REMUNERATION

No.	Output	Indicative Timeline	Percentage of Contract Amount	Payment Trigger
1.	Inception Report and Work Plan	Weeks 1–2	10%	Upon approval of the Inception Report, including the detailed methodology, work plan, data requirements, stakeholder engagement plan, risk management plan and reporting schedule.
2.	Baseline, Regulatory, Satellite and NTN Service Landscape and Monitoring Needs Assessment Report	Weeks 3–10	15%	Upon submission and acceptance of the Diagnostic and Gap Analysis Report covering the baseline and regulatory review, data inventory, satellite and NTN service landscape, existing monitoring capability, identified gaps, monitoring requirements and priority monitoring needs. 1st stakeholder workshop.
3.	Current-State Monitoring Capability, Gap Analysis, GIS Mapping and International Benchmarking Report	Weeks 6–14	15%	Upon acceptance of the International Benchmarking and Technical Options Report, including international best practices, assessment of alternative monitoring approaches, preliminary technical options, viability considerations and prioritization criteria. 1st Training workshop.
4.	Technical Options, Recommended Monitoring System Architecture, Technical Specifications and Monitoring Procedures Report	Weeks 10–20	20%	Upon acceptance of the recommended monitoring system architecture, technical specifications, monitoring and interference management procedures, viability assessment, costing model, procurement options and implementation roadmap.
5.	Costing, Procurement, Implementation, Institutional, Sustainability and Capacity Building Report	Weeks 16–24	20%	Upon acceptance of the Draft National Satellite and NTN Monitoring and Implementation Framework, including institutional and sustainability arrangements, capacity-building plan, training outputs and knowledge-transfer materials. 2nd training workshop.
6.	Draft and Final National Satellite and NTN	Weeks 24-32	20%	Upon acceptance and approval of the Final National Satellite and NTN

No.	Output	Indicative Timeline	Percentage of Contract Amount	Payment Trigger
	Monitoring and Implementation Framework, Validation Report and Complete Handover Package			Monitoring and Implementation Framework, incorporating agreed stakeholder comments and validation outcomes, together with the complete handover package comprising final technical specifications, procedures, datasets, GIS outputs, costing models, implementation roadmap, training materials and presentations. 2nd stakeholder workshop.
Total			100	

7. MINIMUM REQUIREMENTS FOR CONSULTANT'S QUALIFICATIONS AND EXPERIENCE

a) Core business and years in business: The consulting firm must be registered or incorporated with core business in the field of ICT Consulting & Advisory for a minimum of ten (10) years.

b) Relevant experience: The firm should provide evidence of having successfully completed at least two (2) assignments of similar nature and complexity, specifically in the area of satellite communications, spectrum monitoring and regulatory advisory work, radio frequency engineering, technical system design and development of ICT regulatory or infrastructure frameworks in the last ten (10) years. Details of these assignments, including client names and addresses, scope, value, and duration, must be provided with the Expression of Interest (EoI).

c) Technical and managerial capability of the consulting firm: The firm must demonstrate sufficient technical and managerial capacity to carry out the assignment.

The above requirement is the shortlisting criteria that will be used in the shortlisting exercise.

Technical capability

The Consultant shall demonstrate capacity in satellite communications engineering, RF and antenna systems, spectrum monitoring, interference detection and geolocation, GSO/NGSO systems, earth stations, gateways, satellite IoT and direct-to-device technologies.

The Consultant shall have access to appropriate technical tools, software, datasets and methodologies for satellite monitoring system assessment and design.

Expertise area	Minimum expected capability
Satellite communications engineering	Experience with GSO, NGSO, earth stations, gateways, ESIM and satellite IoT systems.
Spectrum monitoring	Experience in RF monitoring, signal analysis, geolocation, direction finding, interference investigation and monitoring system design.
ITU regulatory procedures	Knowledge of ITU Radio Regulations, BR IFIC, coordination, notification, MIFR and harmful interference procedures.

RF and antenna systems	Knowledge of C, Ku, Ka, L and S band monitoring, antenna systems, LNAs/LNBs, receivers and measurement chains.
Non-terrestrial networks	Understanding of HAPS, IMT-NTN integration and direct-to-device satellite developments.
Regulatory policy	Experience supporting ICT regulators and government agencies.
Procurement and costing	Ability to prepare technical specifications, implementation roadmaps and cost estimates.
Cybersecurity and data protection	Knowledge of secure monitoring systems, data protection, access control, logs and reporting dashboards.

8. TEAM COMPOSITION AND MINIMUM QUALIFICATION AND EXPERIENCE REQUIREMENTS FOR THE KEY EXPERTS

The Consultant shall provide a multidisciplinary team with the following minimum key experts:

No.	Team Member / Expert	Minimum Qualifications and Experience
1.	Team Leader / Telecommunications Policy & Regulation Expert	Master's degree in Telecommunications, ICT Policy, Engineering, Economics, Public Policy, Project Management or a related field. At least 10 years' experience in telecommunications management, spectrum management, licensing, ICT policy or regulatory framework development. Demonstrated experience leading at least three (3) comparable assignments. PMP or equivalent is an added advantage.
2.	Satellite Communications / NTN Engineering Expert	Bachelor's degree in Telecommunications Engineering, Electrical/ Electronic Engineering, Satellite Communications, Radio Engineering or a related field. At least 8 years' experience in satellite communications and NTN systems, including GSO/NGSO systems for FSS, MSS, BSS, earth stations, gateways, VSAT, ESIM, HAPS, satellite IoT, direct-to-device services and/or IMT-NTN.
3.	Spectrum Monitoring, RF and Antenna Systems Expert	Bachelor's degree in Telecommunications, Electrical/Electronic Engineering, RF Engineering, Radio Engineering or a related field. At least 8 years' experience in spectrum monitoring, RF measurement and analysis, satellite signal identification, interference investigation, direction finding, geolocation, antenna systems, receivers, RF front-end systems, spectrum analyzers and calibration.
4.	GIS, Data Systems and Cybersecurity Expert	Bachelor's degree in GIS, Geomatics, Geography, Data Science, Computer Science, ICT, Cybersecurity, Engineering or a related field. At least 7 years' experience in GIS mapping, spatial analysis, satellite and earth-station mapping, geospatial databases, dashboards, systems integration, data governance and cybersecurity. Proficiency in ArcGIS, QGIS or equivalent is required.
5.	Infrastructure Economics, Costing and Procurement Expert	Bachelor's degree in Finance, Economics, Accounting, Business, Engineering Economics or a related field. At least 8 years' experience in infrastructure financial modelling, CAPEX/OPEX analysis, lifecycle costing, procurement options, NPV, sensitivity analysis, value-for-money assessment and investment appraisal. Experience in telecommunications, satellite or ICT infrastructure projects is desirable.
6.	Project Implementation, Sustainability and Monitoring Expert	Bachelor's degree in project management, Communications, Public Relations, Monitoring and Evaluation, Social Sciences, Development Studies, or a related field. At least 7 years' experience in infrastructure implementation, sustainability assessment, institutional capacity assessment, performance monitoring, risk

No.	Team Member / Expert	Minimum Qualifications and Experience
		management, implementation planning and development of operational and maintenance models. Experience in telecommunications or ICT infrastructure is desirable. Demonstrated experience in developing stakeholder engagement plans, coordinating multi-stakeholder consultations, documenting stakeholder inputs and facilitating technical validation workshops.

The key experts proposed under Section 12 (iii) shall constitute the minimum team.

The Consultant may propose additional supporting experts where necessary, including specialists in satellite regulatory coordination, software/systems integration, procurement, legal/regulatory analysis or specialized RF engineering

9. ESTIMATED TIME INPUTS FOR KEY EXPERTS

The estimated time input for each key expert is provided below.

No.	Team Member / Expert	Key Role in the Assignment	Indicative Period of Involvement
1.	Team Leader / Satellite & Telecommunications Policy & Regulation Expert	Overall coordination, methodology, quality assurance, stakeholder engagement, supervision of experts, coordination of workshops and training activities, and consolidation of all deliverables and final outputs.	Weeks 1–32
2.	Satellite Communications / NTN Engineering Expert.	Assessment of satellite and NTN services, technical requirements, GSO/NGSO systems, earth stations and gateways; development of monitoring requirements, system architecture, technical options and specifications; technical input to training and knowledge transfer.	Weeks 1–32
3.	Spectrum Monitoring, RF and Antenna Systems Expert	Assessment of spectrum monitoring requirements, RF measurement and analysis, satellite signal identification, interference investigation, direction finding and geolocation; assessment of antennas, receivers and monitoring equipment; development of monitoring and interference management procedures; technical input to training.	Weeks 1–32
4.	GIS, Data Systems and Cybersecurity Expert	GIS and spatial analysis, satellite and earth-station mapping, monitoring coverage assessment, geospatial databases and dashboards; assessment of data governance, systems integration, interoperability and cybersecurity requirements.	Weeks 3-32
5.	Infrastructure Economics, Costing and Procurement Expert	Develop CAPEX/OPEX and lifecycle costing models; assess procurement options; conduct financial and economic analysis and assess value for money and cost the recommended monitoring system and implementation roadmap.	Weeks 8-32
6.	Project Implementation, Sustainability and Monitoring Expert	Develop implementation arrangements, institutional roles and responsibilities, operational and maintenance arrangements, a sustainability model, a performance monitoring framework, a risk analysis and an implementation roadmap. Stakeholder consultations, workshop support, validation activities and compilation of findings.	Weeks 1–32

Notes:

i. The estimated person-weeks/person-months are indicative and represent the minimum level of professional effort expected for successful completion of the assignment.
ii. The Consultant(s) shall submit, as part of its Technical Proposal, a detailed staffing schedule showing the proposed time input for each Key Expert, deployment schedule by assignment phase, interrelationship between experts, and allocation of responsibilities across tasks and deliverables.
iii. The Team Leader shall be responsible for overall coordination of the assignment and shall remain actively involved throughout the thirty-two-week contract period.
iv. The Consultant may propose additional Key Experts or supporting professionals where necessary, to strengthen the implementation approach. The cost of such personnel shall be deemed included in the Consultant's Financial Proposal.
v. The procuring entity reserves the right to require adjustments to the staffing schedule where the proposed level of effort is inadequate to achieve the objectives of the assignment.

10. MANAGEMENT AND ACCOUNTABILITY OF THE ASSIGNMENT

The Consultant must ensure that the tasks identified above are performed in a result-oriented manner with the sole objective of achieving the outputs and outcomes described in these Terms of Reference. The consultancy is encouraged to utilize local expertise as appropriate.

CA shall provide the following to the best of its ability:

a) Relevant and available data, studies, regulatory documents and literature considered relevant for accomplishing identified tasks.
b) Support in accessing key officials within relevant Ministries, agencies, operators, regulators and other key players as applicable.
c) Assistance with convening key stakeholders and support for cooperation with the Government of Kenya and other organizations whose activities & programmes are relevant to the assignment.
d) Guidance and feedback required with regard to deliverables and the Terms of Reference.
e) Access to available information on CA's spectrum management and monitoring systems, subject to applicable confidentiality and data-governance requirements.

11. OBLIGATIONS OF THE CONSULTANT

The Consultant shall carry out the assignment professionally, diligently and in accordance with the approved Terms of Reference, contract provisions, work plan, timelines and agreed deliverables. The Consultant shall provide all resources required to undertake the services, including qualified personnel, travel, technical/site visits, information technology, communication facilities, reporting materials, insurance and any other resources necessary for successful completion of the assignment.

The Consultant shall ensure that all outputs meet professional, technical, legal, regulatory and contractual requirements and are prepared using modern tools and technologies. The assignment shall be undertaken through a consultative process that promotes stakeholder validation and ownership of the outputs.

The Consultant shall also maintain confidentiality, protect all data obtained, avoid conflicts of interest and submit all reports, datasets, maps, technical specifications, models, dashboards, training materials, manuals and related materials in the required formats as property of the Authority.

12. PROPRIETARY RIGHTS OF THE CLIENT IN REPORTS AND RECORDS

The Consultant shall hand over all original, editable and source files necessary for the Authority to use, operate, maintain, update and further develop the National Satellite and NTN Monitoring and Implementation Framework and associated monitoring systems. This shall include, where applicable, databases, GIS layers and geodatabases, dashboards, application programming interfaces (APIs), source code, system configurations, technical specifications, costing models, assumptions, calculation sheets, monitoring procedures, training materials and other supporting documentation.

Where third-party resources, datasets, licenses, proprietary tools or other intellectual property are incorporated into the outputs, the Consultant shall clearly identify such components and provide the Authority with the applicable licensing terms, usage rights and restrictions. The Consultant shall, wherever practicable, ensure that the Authority receives sufficient rights to continue using and maintaining the outputs after completion of the assignment.

The Consultant shall maintain the confidentiality, integrity and security of all information obtained during execution of the assignment, including regulatory, licensing, spectrum, satellite network, earth-station, interference, technical, commercial, GIS, cybersecurity and stakeholder information. The Consultant shall ensure that any information or datasets obtained from satellite operators, telecommunications operators, government agencies, technology providers or other stakeholders are used strictly for the purposes of the assignment and are handled in accordance with any applicable confidentiality, data-sharing or usage restrictions.

All reports, data, databases, GIS datasets, maps, dashboards, software applications, source code, analytical models, financial and lifecycle costing models, technical specifications, monitoring procedures, training materials, manuals, records, survey and assessment instruments, metadata, documentation and any other outputs developed or collected by the Consultant in the course of this assignment shall become the exclusive property of the Communications Authority of Kenya (CA) upon acceptance and full payment for the respective deliverables.

The Consultant shall not publish, reproduce, disclose, assign, license, commercialize or otherwise use any project information, data or deliverables developed under the assignment for any purpose without the prior written consent of the Authority.

The Consultant shall comply with all applicable laws and regulations, including the Data Protection Act, 2019, applicable intellectual property and confidentiality requirements, and the prevailing information security and data governance policies.