KENYA NATIONAL BUREAU OF STATISTICS

P.O.BOX 30266-00100

NAIROBI

TENDER NO. KNBS/EOI/59/2015-2016

EXPRESSION OF INTEREST

FOR

PROVISION OF HIGH RESOLUTION AERIAL PHOTOGRAPHS AND SATELLITE IMAGERY FOR 2019 KENYA POPULATION CENSUS MAPPING

CLOSING DATE: - 4TH JULY, 2016

TERMS OF REFERENCE

PROVISION OF HIGH RESOLUTION AERIAL PHOTOGRAPHS AND SATELLITE IMAGERY FOR 2019 KENYA POPULATION CENSUS MAPPING

BACKGROUND

Kenya National Bureau of Statistics (KNBS) is a State Corporation under the Ministry of State for Planning and Devolution established under the Statistics Act 2006 mandated by law to collect, analyze and disseminate socio-economic statistics needed for planning and policy formulation in Kenya. The Vision of the Bureau is to become a centre of excellence in statistical production and management for national development.

SCOPE OF THE 2019 KPHC CENSUS CARTOGRAPHIC PILOT MAPPING

The Cartographic pilot mapping for 2019 KPHC will be conducted in Trans Nzoia County and North Pokot Sub County. The total area to be covered during the pilot is 6,448.8 Km^2 of which the rural will cover 6,322.60 Km^2 and urban (Kitale Town) will cover 130 Km^2

1. **SPECIFICATIONS FOR VERTICAL AERIAL PHOTOGRAPHY FOR SELECTED URBAN CENTRES**

Area of Interest (AOI)

Area to be covered will be the Kitale Town in Trans Nzoia County

Total Coverage

The approximate area to be covered is 130 Km^2.

Scope of Specification

This specification applies to the capture and post processing of vertical aerial photographs using digital camera on aircraft. The focus of these specifications is on the delivery of final products that meet Clients' requirement for current and future use in the most cost effective manner.

Deliverables

The primary deliverable from vertical aerial photography is digital imagery which should be supplied in TIFF and compressed ECW format. The imagery must be ortho-rectified and other secondary deliverables may also be required.

Acquisition Requirements

Platform

Aircraft will be required to operate at a minimum altitude of 960 feet above ground level (agl) to achieve a ground sampling distance of 10 cm accuracy. In exceptional circumstances it may be required to fly at higher altitudes.

Flight Planning

It will be the responsibility of the client to provide shape files for areas of interest for flight planning purposes.

Camera

Vertical photography will be exposed using a large format metric camera or sensor. For vertical aerial photography the current calibration certificate from the manufacturer or an approved standardizing laboratory for any sensor lens that will be used must be provided. The report shall not be more than two years older than the date of the photography.

Image Resolution

The resolution of the images shall not be less than 15 cm. All image files shall be clearly labeled with a consistent string depicting Strip Number, Image Number, Date and Time (SN_IN_DDMMYY_HHMM).

Stereo Imagery

All vertical aerial photography will be acquired as overlapping (stereo) frames or swaths.

For perspective center cameras the required forward overlap between consecutive photographs in each flight strip will be 60% unless otherwise specified. The deviation range in forward overlap will not exceed +/- 5%.

The minimum lateral overlap shall be 30% unless otherwise specified. The deviation range in lateral overlap will not exceed +/- 5%.

Camera Attitude

Photography will not be undertaken when atmospheric conditions are likely to produce excessive tilts in the aerial photographs or deviation from flight paths.

Compensation is to be made for crabbing and drift by rotating the camera about the vertical axis such that the lateral edges of each frame are parallel to and not displaced laterally from the intended flight path by more than 5% of the specified side overlap.

Atmospheric Conditions

No cloud or cloud shadow should obscure detail on any area being photographed. The photography will not be attempted when smoke, haze or any other conditions would impair the quality of the photographic image. Cloud cover of more than 10% will not be permitted and more so any cloud at the principal point shall be avoided. The Images shall not contain shadows longer than 0.5 the feature size on the image.

Solar Altitude

Photography over open terrain with low relief will not be attempted when the solar altitude is less than 25 degrees, or less than 35 degrees over steep

Coverage

Each run will extend outside the specified area by at least one stereoscopic pair, i.e. two principal points will fall outside of the specified area at the beginning and end of each run.

The first and last runs will have at least 15% of each photograph extending laterally outside of the boundaries of the specified area.

Airborne GNSS Data

The recording by airborne high performance GNSS data receiver for photo centers and photo metadata is part of the aerial photography acquisition requirements.

Image Quality and Colour Balance

Raw metric digital imagery with the same quality of Colour Balance and Consistency as the Benchmark imagery samples must be provided. Colour image balancing and correction done on the image shall be saved as a separate file and the original clearly marked and maintained. All (AOI) shall be covered by overlapping imagery.

Orthophoto Deliverables

Deliverables will often be limited to the supply of orthophotos (ortho-rectified image) tiles (ie the primary deliverable) which are 3 band (RGB) orthophoto tiles projected to UTM coordinates and Arc 1960 as a datum.

A metadata record for each data file.

Secondary Deliverables

Clearly marked raw (un-rectified) imagery as frames or swathes In JPEG and TIFF format on a hard drive

Ground control identification sketches and their surveyed coordinates (in terms of MGA/AHD)

Image support files (interior and exterior orientation data for each frame or image swathe)

Digital elevation model (DEM)

Digital photo mosaic covering the entire AOI tiled to four(4) km^2 and two(2)hard copies plotted on A0 sheet size (GEOTIFF format)

Flight index diagram two hard copies and a vector digital copy geo-referenced to ITRF Reference Datum indicating individual photo position. (Esri shape file format)

GNSS data for camera center air station coordinates.

Photography report indicating information on pre flight mission, on board and post processing procedures (Aero-triangulation report/s)

Specific Metadata Requirements

A number of additional metadata requirements shall be recorded for all aerial Photography as listed in the table below.

METADATA ELEMENTS
Acquisition Start Date
Acquisition End Date
Sensor type
Focal Length
Flying Height (AGL)
INS/IMU Used
Number of Runs
Number of Frames/Swathes
Output Pixel Size

Description of Aero triangulation Process Used and Residual Results
Description of Ortho-rectification Process Used
Spatial Accuracy –Horizontal
Spatial Accuracy –Vertical
Limitations of the Data

Mandatory Requirements

a. Large format Digital Camera with (FMC) capability
b. On board Instrument measuring Unit (IMU) report
c. Certified Camera calibration report(2 Years and Below)
d. List of jobs completed in the last FIVE (5) years and copies delivered to the **Director of Surveys**
e. Completion certificates by clients of Jobs done (4) above

Compliance with the Director of Surveys Requirements

The following are expected to be supplied the Director of Surveys on the completion of the exercise:-

a. Copies of Digital imagery in TIFF & JPEG formats
b. Copies of Lidar Data in .LAS format
c. Camera calibration Report(s)
d. Fight Index diagram(s) and related report.

MUST

a. Seek Clearance from the Director of Surveys
b. You will be expected to comply with the civil aviation and Department of defence regulations.
c. **ALL** maps produced **MUST** comply with **KNSDI** standards and a copy delivered to the Director of Surveys.

2. HIGH RESOLUTION SATELLITE IMAGERY

Area of Interest (AOI)

Area to be covered will be the Trans Nzoia County and North Pokot Sub County in West Pokot County

Total Coverage

Approximately 6455.1 Km2 covering the rural area and small urban areas

Selected Urban Areas

Specifications	Description
1. Degree of cloudiness	Strictly less than 2% per scene
2. Spatial resolution	0.5 metres as per AOI
3. Geometric rectification	Geocoded and resampled to Kenya Reference Frame
4. Radiometric rectification	No line stripping, radiometrically / sun angle corrected
5. Spectral rectification	Spectrally corrected
6. Referencing system	UTM Projected. Arc 1960 or WGS 84 base datum
7. Metadata	Accessible in wordpad or pdf detailing timing, reference system, source, wildfiles, swath, license
8. Inclination angle	Terrain illumination corrected with stated in degrees with time zone (Bi directional Scanning)
9. Number of bands	RGB composited or fused, Panchromatic band (optional)
10. Year required	All scenes be acquired after between November, 2015 and April, 2016
11. Digital format	Strictly GeoTiff or IMG
12. Degree of enhancement	Uniformly composited and balanced
13. Area coverage	As per buffered AOI shapefile given KNBS

i. **Selected Rural Areas with High Population Density**

Specifications	Description
1. Degree of cloudiness	Strictly less than 5% per scene
2. Spatial resolution	0.4 or 0.6metres as per AOI
3. Geometric rectification	Geocoded and resampled to Kenya Reference Frame.
4. Radiometric rectification	No line stripping, radiometrically / sun angle corrected
5. Spectral rectification	Spectrally corrected
6. Referencing system	UTM Projected. Arc 1960 or WGS 84 base datum
7. Metadata	Accessible in wordpad or pdf detailing timing, reference system, source, wildfiles, swath, license
8. Inclination angle	Terrain illumination corrected with stated in degrees with time zone (Bi directional Scanning)
9. Number of bands	RGB composited or fused, Panchromatic band (optional)
10. Year required	All scenes be acquired after between November, 2015 and April, 2016
11. Digital format	Strictly GeoTiff or IMG
12. Degree of enhancement	Uniformly composited and balanced
13. Area coverage	As per buffered AOI shapefile given KNBS

Selected Rural Areas with Sparse Population Density

Specifications	Description
1. Degree of cloudiness	Strictly less than 5% per scene
2. Spatial resolution	0.6 to 2metres as per AOI
3. Geometric rectification	Geocoded and resampled to Kenya Reference Frame.
4. Radiometric rectification	No line stripping, radiometrically / sun angle corrected
5. Spectral rectification	Spectrally corrected
6. Reference system	UTM projected. Arc 1960 or WGS 84 base datum
7. Metadata	Accessible in wordpad or pdf detailing timing, reference system, source, wildfiles, swath, license
8. Inclination angle	Terrain illumination corrected with stated in degrees with time zone (Bi directional Scanning)
9. Number of bands	RGB composited or fused, Panchromatic band (optional)
10. Year required	All scenes be acquired after between November, 2015 and April, 2016
11. Digital format	Strictly GeoTiff or IMG
12. Degree of enhancement	Uniformly composited and balanced
13. Area coverage	As per buffered AOI shapefile given KNBS

Ancillary Data and Information

The following will be provided:

a. Accessibility to KNBS Kenya administrative/political boundaries as shapefiles/coverages
b. Previous mapped areas in GIS format
c. Digital Elevation model DEM for the whole country.
d. Contour map (Optional)

e. Detailed topographical maps digital copies at scale 1:50,000

Deliverables

a. High resolution satellite imagery Tiled Imagery in GEOTIFF format
b. Vertical aerial photographs in digital format
c. Index diagram indicating the reference of each Image Tile Geo-referenced to ARC 1960 Datum and Clarke 1880 spheroid with coordinates in Geographical.

3. ONLINE IMAGERY

Technical Specifications for Online Imagery Service

The service provider shall supply, install and commission online satellite imagery service with the following specifications.

a. Image resolution should be 60 cm or better;
b. Images should be supplied with at least 3 spectral bands
c. Service should allow for online content update every 3 months, every 6 months or every 12 months;
d. The service should allow for view and download license where up to 10GB can be downloaded per day.
e. Imagery service should be capable of providing Town, County or Country coverage;
f. Image service should be capable of providing images in Jpeg, Tiff, BMP or any other GIS compatible format that can be geo referenced and geo-rectified for use on any GIS or Remote Sensing software
g. Images should have a cloud cover less than 10%;
h. Images should be availed as either 8, 11 or 16 bit images.
i. Service should allow one to toggle between imagery dates inside a front end application e.g. Geo Media, ArcGIS etc.
j. Service should allow for direct printing of maps;
k. Service should be possible to be used off line on tablets to facilitate field data collection;

l. Delivery of the online image service should be possible through the internet while adhering to OGC standards (WMS, WMTS, WFS, ARCGIS image CONNECT)
m. Image service should be able to facilitate multi-user and multi-agency access;
n. Pricing for the image service should be calculated on an annual subscription basis

EVALUATION CRITERIA – AERIAL IMAGERY AND ONLINE IMAGERY SERVICES

STAGE 1. MANDATORY REQUIREMENTS

i) PIN/VAT Certificate
ii) Valid Tax compliance Certificates
iii) Single Business Permit/Trade license
iv) Certificate of Registration/ Incorporation
v) Financial Audited statements for the last three years i.e. 2012, 2013 and 2014.
vi) Declaration stating that you have NOT been debarred by Public Procurement Regulatory Authority (PPRA).
vii) Properly filled, signed and stamped Confidential Business Questionnaire.
viii) Presentation of the entire tender document in a logical manner indicating table of content and page numbers/ Serialization of the proposal document.

NOTE: Any proposals that fail to meet any of the above requirements will be deemed non-responsive and will be automatically disqualified.

STAGE 2 - TECHNICAL EVALUATION CRITERIA

1.0 HIGH RESOLUTION AERIAL IMAGERY

NO	ITEMS	DETAILS	WEIGHT
1	**Evidence of Aircraft ownership**	(i) Attach certified copies of ownership documents such as registration certificate	7

NO	ITEMS	DETAILS	WEIGHT
		(ii) Attach latest maintenance certificate of the Aircraft	5
2	**Proof of ownership of Photography Equipment and software**	(i) Attach evidence of ownership of at least two Medium - Large format Digital Camera with (FMC) capability	4
		(ii) Attach evidence of ownership of On Board Instrument Measuring Unit (IMU) report	4
		(iii) Attach certified camera calibration certificate (2 years and below)	4
		(iv) Attach certified copy of manufacturer/developer authorization to use photogrammetry software	4
		(v) current calibration certificate from the manufacturer or an approved standardizing laboratory for sensor lens that will be used	4
3	**Evidence of similar assignments recently undertaken**	(i) Attach certified copies of at least five (5) contracts/LPOs of similar jobs completed in the last (5) years and copies delivered to Director of Survey.	5
		(ii) Attach certified copies of Completion certificates of (i) above by clients	5
		(iii) Attach recommendation letters from at least five (5) reputable clients	5
		(iv) Evidence of compliance from relevant government agencies (Director of Survey, DoD and Civil Aviation	

NO	ITEMS	DETAILS	WEIGHT
4	**Experience of the Company**	(i) Attach proof/evidence of experience as a prime contractor in the provision of at least one project of census nature or equivalent over the last ten years.	5
		(ii) Proof of at least fifteen years working experience with digital mapping using both aerial photography and satellite imagery	5
5	**Staff Requirements**	**(i) Project Manager**	
		- Master's degree in GIS, Geomatics, Photogrammetry or equivalent	5
		- At least 8 years' experience	5
		(ii) Technical personnel – 3 pax	
		– Bachelor degree/Diploma in aerial photography, photogrammetry, spatial data management or equivalent	3
		–At least five (5) years' experience	3
6	**Quality Control**	(i) Attach quality Assurance/ Quality Control Plan	9
7	**Adequacy of Proposed methodology and work plan**	(i) Proposed Work plan	9
		(ii) Proposed Methodology	9
	Total		**100**

2.0 EVALUATION CRITERIA- HIGFH RESOLUTION ON-LINE IMAGERY SERVICES

NO	ITEMS	DETAILS	WEIGHT
1	**Evidence of on-line imagery service Provision**	(i) Attach certified copy of the manufacturer's authorization to sell or deal in on-line high resolution imagery	10
		(ii) Attach registration certificate of dealership.	9
2	**Evidence of similar assignments recently undertaken**	(i)Attach certified copies of at least two (2) contracts/LPOs of similar jobs completed in the last (3) years.	6
		(ii) Attach certified copies of Completion certificates for the above jobs	6
		(iii)Attach recommendation letters from at least two (2) reputable clients	6
3	**Experience of the Company**	(i) Attach proof/evidence of experience in web-based GIS database design, development, integration and management	8
		(ii) Proof of at least fifteen years working experience with digital mapping using GIS platform/mobile mapping	8
5	**Staff Requirements**	**(i) Project Manager**	
		Master's degree in GIS, Geomatics, Photogrammetry or equivalent	7
		At least 8 years' experience	7
		(ii) Technical personnel – 3 pax	

NO	ITEMS	DETAILS	WEIGHT
		Bachelor degree/Diploma in aerial photography, photogrammetry, spatial data management or equivalent	8
		At least five (5) years' experience	5
6	**Adequacy of Proposed methodology and work plan**	Proposed Work plan	10
		Proposed Methodology	10
	Total		**100**

Complete EOI documents submitted in two copies **"ORIGINAL"** and **"COPY"** and placed in plain sealed envelopes clearly marked the tender reference and name should be addressed to: -

The Director General
Kenya National Bureau of Statistics
P.O Box 30266-00100
NAIROBI

The EOI document should be deposited in the Tender Box situated at Herufi House, 1st Floor and to be received **on or before 4th July, 2016 at 10:00 a.m.** Bulky E O I documents which will not fit in the tender box shall be delivered and received at the Senior Manager, Procurement office, 2nd Floor Herufi House.

EOI documents will be opened immediately thereafter in the presence of the bidders' representatives who choose to attend the opening at the KNBS Board room located on 1st floor Herufi House.

Canvassing will lead to automatic disqualification.

SENIOR MANAGER, PROCUREMENT
FOR: DIRECTOR GENERAL

CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2(b) or 2(c) whichever applied to your type of business.

You are advised that it is a serious offence to give false information on this form.

Part 1 General

Business Name .....
Location of Business Premises .....
Plot No, ...Street/Road .....
Postal address .....Mobile No. ……Email ……
Nature of Business .....
Registration Certificate No.....
Maximum value of business which you can handle at any one time – Kshs.....
Name of your bankers.....
Branch .....
Account Number……..

Part 2 (a) – Sole Proprietor

Your name in full…….Age…….
Nationality……Country of Origin……..
Citizenship details
……..

Part 2 (b) – Partnership

Given details of partners as follows

Name	Nationality	Citizenship details	Shares
1. ……			
2. ……			
3. ……			
4. ……			

Part 2 (c) – Registered Company

Private or Public
State the nominal and issued capital of company
Nominal Kshs.
Issued Kshs.
Given details of all directors as follows

Name	Nationality	Citizenship details	Shares
1. ……			
2. ……			
3. ……			
4. ……			

Date…….Signature of Candidate……..