

---

**Request for Bids for Supply of Goods**

***Supply and Delivery of a Unmanned Aerial Vehicle***

Date: 16/02/2022

**Invitation for Bid (IFB) through Open Tender (National)**

Project title: Strengthening Risk Information for Disaster Resilience in Bhutan[P175081]

Source of Funding: World Bank

Contract Ref: NCHM/PRO-01/2021-22/0163

Dear Sir/Madam,

1. You are invited to submit your priced bid for the supply of the following items:

- 1) **Unmanned Aerial Vehicle** (1 no.)

*(Information on technical specifications and required quantities are attached as Price Schedule)*

2. The bidder(s) must quote for all the items under this invitation. Priced quotations will be evaluated for all the items together as a single package and contract awarded to the firm offering the lowest evaluated total cost.
3. The bidder(s) shall submit one original of the priced quotation with the Form of Bid, clearly marked ORIGINAL. In addition, the bidder(s) should also submit one copy marked as COPY. The quotation including all documents in the attached format should be sealed in an envelope and addressed to and delivered at the following address:

Your quotation in the required format should be addressed and submitted to:

Procurement Officer

National Center for Hydrology and Meteorology

Thimphu: Bhutan

Telephone: 02-322794

Email ID: tashidendup@nchm.gov.bt

4. The deadline for receipt of your quotation(s) by the purchaser at the indicated address is on the 15 March 2022, on or before 10:30 AM (BST).

- 
5. Bids shall be accompanied by a bid security of Nu. 45,000/- in the form of cash warrant, demand draft, or unconditional Bank Guarantee valid till 30<sup>th</sup> May 2022. Any bid not accompanied by bid security shall be treated as non-responsive.
  6. Quotation by fax or by electronic means **are not** acceptable.
  7. The quotation should be submitted as per the following instructions and in accordance with the attached Contract. The attached Terms and Conditions of Supply is an integral part of the Contract.
    - a) **PRICE:** all prices shall be quoted in Ngultrum. The quoted price shall be inclusive of all related costs including taxes, duties and other levies to the final place of delivery. The final place of delivery is **National Center for Hydrology and Meteorology, Thimphu.**
    - b) **EVALUATION OF QUOTATION:** offers determined to be substantially responsive to the technical specifications will be evaluated by comparison of their quoted prices. In evaluating the quotations, the purchaser will determine for each quotation the evaluated price by adjusting the price quotation by making any correction for any arithmetical errors as follows;
      - (i) Where there is a discrepancy between amounts in figures and in words, the amount in words will govern;
      - (ii) where there is discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted shall govern unless in the opinion of the Employer there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted shall govern, and the unit rate shall be corrected.
      - (iii) if the supplier refuses to accept the correction, the quotation will be rejected and the bid security forfeited.
    - c) **AWARD OF PURCHASE ORDER:** the award will be made to the bidder who has offered the lowest evaluated price that meets the specifications. The

---

successful bidder will sign a contract as per attached form of contract and terms and conditions of supply.

d) **VALIDITY OF THE OFFERS:** the quotation(s) shall be valid for a period of 60 days from the deadline for receipt of quotation(s).

8. Further information can be obtained from: *Procurement Section; NCHM*
9. The Royal Government of Bhutan has received a grant of USD: 3.5 M towards the cost of strengthening disaster preparedness and response capacity project and intends to apply part of the proceeds of this grant to eligible payments under the contract for which this invitation for quotations is issued.
10. The quotation(s) will be opened in the presence of bidders or their representatives who choose to attend at Mini-conference hall, NCHM on 15 March, 2022 at 11:00 AM (BST).
11. The Purchaser is not bound to accept the lowest bid and reserves the right to accept or reject any or all the bids without assigning any reason whatsoever.
12. The Purchaser will notify the winning bidder of the award of contract prior to the expiry of quotation validity period. The terms of the accepted offer shall be incorporated in the supply order.
13. The Goods supplied should have a minimum Warranty/guarantee of 12 months from the date of acceptance.
14. Ten percent (10%) of the Contract Price shall be paid within thirty (30) days of signing of the Contract upon submission of a claim and an advance payment guarantee for the equivalent amount valid until the Goods are delivered and in the form provided in the Bidding Documents.
15. Ninety percent (90%) of the Contract Price shall be paid to the Supplier within thirty (30) days after the date of the acceptance certificate for the respective delivery issued by the Purchaser. The ten (10) percent performance security shall be retained as security deposit

---

and paid at the end of the warranty period or after six (6) months whichever is later after adjustment of dues if any.

---

**Schedule of Items and Priced Quotation (Bid form)***[To be filled in by Bidders]*

Sl	Item Description	Unit	Qty	Make/Model	Unit Rate (Nu.)	Total Amount (Nu.)
1	<b>Unmanned Aerial Vehicle (Equivalent to Matrice 300RTK or higher)</b>	Nos.	01			
	<b>Total Amount for Supply of Goods to Purchaser (Including taxes and all related costs)</b>					
	Goods to be supplied to <i>National Center for Hydrology and Meteorology</i> )					

Total Amount in Nu. (in words)	<i>[insert the Total Amount for Supply of Goods including all related costs].</i>
Delivery period	<i>Insert Number of days from the date of issue of the Purchase Order by the Purchaser</i>
Warranty Provided	<i>.....Months from date of supply or commissioning of the Goods.</i>

Signature of Supplier	Supplier's Official Stamp
Name of Supplier	
Date	

*[The Supplier may attach copies of relevant brochures/catalogue for the goods to be supplied, which will give sufficient information to carry out effective evaluation]*

---

## Technical Specification of the Goods Required

### Unmanned Aerial Vehicle

Aircraft		
1	<b>Dimensions</b>	Unfolded, propellers excluded, 810×670×430 mm (L×W×H) Folded, propellers included, 430×420×430 mm (L×W×H)
2	<b>Diagonal Wheelbase</b>	895 mm
3	<b>Weight (with single downward gimbal)</b>	Approx. 3.6 kg (without batteries) Approx. 6.3 kg (with two TB60 batteries)
4	<b>Operating Frequency</b>	2.4000-2.4835 GHz 5.725-5.850 GHz
5	<b>EIRP</b>	2.4000-2.4835 GHz: 29.5 dBm (FCC); 18.5dBm (CE) 18.5 dBm (SRRC); 18.5dBm (MIC)  5.725-5.850 GHz: 28.5 dBm (FCC); 12.5dBm (CE) 28.5 dBm (SRRC)
6	<b>Hovering Accuracy (P-mode with GPS)</b>	Vertical: ±0.1 m (Vision System enabled) ±0.5 m (GPS enabled) ±0.1 m (RTK enabled)  Horizontal: ±0.3 m (Vision System enabled) ±1.5 m (GPS enabled) ±0.1 m (RTK enabled)
7	<b>RTK Positioning Accuracy</b>	When RTK enabled and fixed: 1 cm+1 ppm (Horizontal) 1.5 cm + 1 ppm (Vertical)
8	<b>Max Speed</b>	S mode: 23 m/s P mode : 17 m/s
9	<b>Service Ceiling Above Sea Level</b>	The UAV will be deployed at the field ranging elevation from 120 m to 6000 m above sea level. The service ceiling above sea level with respect to propeller design should be as follows:

		1) 5000 m (with 2110 propellers, takeoff weight $\leq 7$ kg) and 2) 7000 m (with 2195 propellers, takeoff weight $\leq 7$ kg).
10	<b>Max Wind Resistance</b>	15 m/s
11	<b>Max Flight Time</b>	55 min
12	<b>Supported DJI Gimbals</b>	Zenmuse DJI L1
13	<b>GNSS</b>	GPS+GLONASS+BeiDou+Galileo
14	<b>Operating Temperature</b>	-20°C to 50°C (-4°F to 122° F)
<b>Remote Controller</b>		
1	<b>Operating Frequency</b>	2.4000-2.4835 GHz 5.725-5.850 GHz
2	<b>Max Transmitting Distance (unobstructed, free of interference)</b>	NCC/FCC: 15 km CE/MIC: 8 km SRRC: 8 km
3	<b>EIRP</b>	2.4000-2.4835 GHz: 29.5 dBm (FCC) 18.5dBm (CE) 18.5 dBm (SRRC); 18.5dBm (MIC)  5.725-5.850 GHz: 28.5 dBm (FCC); 12.5dBm (CE) 20.5 dBm (SRRC)
4	<b>External battery</b>	Name: WB37 Intelligent Battery Capacity: 4920 mAh Voltage: 7.6V Type: LiPo Energy: 37.39Wh Charging time (using BS60 Intelligent Battery Station): 70 minutes (15°C to 45°C); 130 minutes (0°C to 15°C)



5	<b>Built-in battery</b>	Type: 18650 lithium ion battery (5000 mAh @ 7.2 V) Charging: Use a USB charger with specification of 12V / 2A Rated power: 17 W Charging time: 2 hours and 15 minutes (Using a USB charger with specification of 12V / 2A)
6	<b>Battery Life</b>	Built-in battery: Approx. 2.5h Built-in battery+External battery: Approx. 4.5h
7	<b>USB Power Supply</b>	5 V / 1.5 A
8	<b>Operating Temperature</b>	-20°C to 40°C (-4 °F to 104 °F)
<b>Vision System</b>		
1	<b>Obstacle Sensing Range</b>	Forward/Backward/Left/Right: 0.7-40m Upward/Downward: 0.6-30m
2	<b>FOV</b>	Forward/Backward/Downward: 65° (H), 50° (V) Left/Right/Upward: 75°(H), 60°(V)
3	<b>Operating Environment</b>	Surfaces with clear patterns and adequate lighting (> 15 lux)
<b>Infrared ToF Sensing System</b>		
1	<b>Obstacle Sensing Range</b>	0.1-8m
2	<b>FOV</b>	30° (±15°)
3	<b>Operating Environment</b>	Large, diffuse and reflective obstacles (reflectivity >10%)
<b>Top and bottom auxiliary light</b>		
1	<b>Effective lighting distance</b>	5 m
<b>FPV Camera</b>		
1	<b>Resolution</b>	960p
2	<b>FOV</b>	145°

3	<b>Frame rate</b>	30 fps
<b>Intelligent Flight Battery</b>		
1	<b>Name</b>	TB60
2	<b>Capacity</b>	5935 mAh
3	<b>Voltage</b>	52.8 V
4	<b>Battery Type</b>	LiPo 12S
5	<b>Energy</b>	274 Wh
6	<b>Net Weight</b>	Approx. 1.35 kg
7	<b>Operating Temperature</b>	-4°F to 122°F (-20°C to 50°C)
8	<b>Ideal storage temperature</b>	71.6°F to 86°F (22°C to 30°C)
9	<b>Charging Temperature</b>	-4°F to 104°F (-20°C to 40°C) (When the temperature is lower than 5°C, the self-heating function will be automatically enabled. Charging in a low temperature may shorten the lifetime of the battery)
10	<b>Charging time</b>	Using BS60 Intelligent Battery Station: 220V input: 60 minutes (fully charging two TB60 batteries), 30 minutes (charging two TB60 batteries from 20% to 90%) 110V input: 70 minutes (fully charging two TB60 batteries), 40 minutes (charging two TB60 batteries from 20% to 90%)
<b>BS60 Intelligent Battery Station</b>		
1	<b>Dimensions</b>	501*403*252mm
2	<b>Net Weight</b>	8.37kg
3	<b>Maximum Capacity</b>	TB60 Intelligent Flight Battery × 8 WB37 Intelligent Battery × 4

4	<b>Input</b>	220-240 VAC, 50-60 Hz
5	<b>Max. Input Power</b>	1070W
6	<b>Output Power</b>	220-240 V: 992 W
7	<b>Operating Temperature</b>	-4°F to 104°F (-20°C to 40°C)

<b>Zenmuse L1</b>		
1	<b>Dimensions</b>	152×110×169 mm
2	<b>Weight</b>	930±10 g
3	<b>Power</b>	Typical: 30 W; Max: 60 W
4	<b>IP Rating</b>	IP54
5	<b>Operating Temperature Range</b>	-20° to 50° C (-4° to 122° F) 0° to 50° C (32° to 122° F) (when using RGB mapping camera)
6	<b>Storage Temperature Range</b>	-20° to 60° C (-4° to 140° F)
7	<b>System Performance</b>	<b>Detection Range :</b> 450 m @ 80% reflectivity, 0 klx ; 190 m @ 10% reflectivity, 100 klx <b>System Accuracy:</b> Horizontal: 10 cm @ 50 m; Vertical: 5 cm @ 50 m <b>Real-time Point Cloud Coloring Modes:</b> Reflectivity, Height, Distance, RGB
8	<b>Lidar</b>	<b>Ranging Accuracy:</b> 3 cm @ 100 m <b>Maximum Returns Supported:</b> 3 <b>FOV:</b> Non-repetitive scanning pattern: 70.4° (horizontal) × 77.2° (vertical) ; Repetitive scanning pattern: 70.4° (horizontal) × 4.5° (vertical) <b>laser Safety:</b> Class 1 (IEC 60825-1:2014) (Eye Safety)

		<b>Scan Modes:</b> Non-repetitive scanning pattern, Repetitive scanning pattern
9	<b>Inertial Navigation System</b>	<b>IMU Update Frequency:</b> 200 Hz, <b>Accelerometer Range:</b> $\pm 8g$ <b>Yaw Accuracy:</b> Real-time: $0.3^{\circ}$ , Post-processing: $0.15^{\circ}$ <b>Pitch / Roll Accuracy:</b> Real-time: $0.05^{\circ}$ , Post-processing: $0.025^{\circ}$
10	<b>Auxiliary Positioning Vision Sensor</b>	<b>Resolution:</b> 1280×960, <b>FOV:</b> $95^{\circ}$
11	<b>RGB Mapping Camera</b>	<b>Sensor Size:</b> 1 inch, <b>Pixels:</b> 20 MP, <b>Photo Size:</b> 472×3078 (16:9); 4864×3648 (4:3); 5472×3648 (3:2), <b>Focal Length:</b> 8.8 mm / 24 mm (Equivalent), <b>Shutter Speed:</b> Mechanical Shutter Speed: 1/2000 - 8 s Electronic Shutter Speed: 1/8000 - 8 s, <b>ISO:</b> Video: 100 – 3200 (Auto), 100 – 6400 (Manual) Photo: 100 - 3200 (Auto), 100 - 12800 (Manual) <b>Aperture Range:</b> f/2.8 - f/11 <b>Photo Format:</b> JPEG, <b>Video Format:</b> MOV, MP4 <b>Video Resolution:</b> H.264, 4K: 3840×2160 30p
12	<b>Gimbal</b>	<b>Stabilized System:</b> 3-axis(tilt,roll,pan), <b>Angular Vibration range:</b> $0.01^{\circ}$ <b>Mount :</b> detachable DJI skyport <b>Mechanical Range:</b> Tilt: $-120^{\circ}$ to $+30^{\circ}$ ; Pan: $\pm 320^{\circ}$ <b>Operation Modes:</b> Follow/Free/Re-center
<b>Data Storage</b>		
1	<b>Raw Data Storage</b>	Photo/IMU/Point cloud data storage/GNSS/Calibration files
2	<b>Supported microSD Cards</b>	microSD: Sequential writing speed 50 MB/s or above and UHS-I Speed Grade 3 rating or above; Max capacity: 256 GB
<b>Post-processing Software</b>		
1	<b>Supported Software</b>	DJI Terra
2	<b>Data Format</b>	DJI Terra supports exporting standard format point cloud models: Point cloud format: PNTS/LAS/PLY/PCD/S3MB format

---

Warranty
All the accessories must have a warranty of 12 months

The Supplier is required to mention the make/model (as applicable) of the goods to be supplied and must attach the appropriate original printed literature/brochures for the various items listed.

---

## **Documents required to be submitted as part of the Quotation**

The original and *copy(ies)* of quotation submitted by the Bidder shall comprise the following:

- (a) A duly completed and signed priced quotation as per the Schedule of Items.
- (b) A valid Trade License<sup>1</sup>;
- (c) A valid Tax Clearance Certificate;
- (d) The required bid security;
- (e) Technical Specification of the Goods to be supplied;
- (f) Any other requirements specified in this document

## **Terms and Conditions for the Supply of Goods and Payment.**

The Terms and Conditions hereinafter may only be varied with the written agreement of the Purchaser and no terms and conditions put forward at any time by the Supplier shall form any part of the Contract.

1. The Supplier shall be required to submit performance security of 10% of the quoted price in the form of cash warrant, demand draft, or unconditional Bank Guarantee issued by a financial institution located in Bhutan, which shall be furnished upon signing the contract. The performance security shall be valid till the end of the warranty period and will be returned after the end of the warranty period.
2. The supply of the goods and related services shall be completed within 45 days from the date of issue of the Purchase Order, or the signing of the contract whichever is later
3. The Supplier shall agree to supply/perform the required after-sales services/maintenance at the quoted price agreed in the contract.
4. The Purchaser shall arrange payment of the invoice, within thirty (30) days upon submission of the original Invoice and against the actually supplied quantities of goods as listed in the Purchase Order.
5. The quoted price shall include all taxes, duties, insurance, and any other costs involved and nothing extra shall be paid.
6. Any goods found defective during the warranty period shall be replaced/repaired by the supplier at his cost. If the supplier fails to rectify and or replace the defective goods, the purchaser shall do it at the cost of the supplier.
7. The supplier shall supply the Goods required within 45 days from the date of placement of the purchase order or signing of the contract. The supplier shall pay liquidated

---

<sup>1</sup> The non submission of historical (b & c) documents should not become rejection criteria and should be given one chance to the bidder(s) to submit.

---

damages at the rate of 0.1% per day for each day of delay to a maximum of 10% of the quoted price.

8. The Purchaser may, by written notice, terminate the Purchase Order (or Contract if applicable) in whole or in part at any time for its convenience:
- a. if the Supplier fails to perform any other Terms and conditions specified with the Purchase Order, or exceeds the maximum amount of liquidated damages.
  - b. if the Supplier fails to perform any other obligation(s) under the Purchase Order, or
  - c. if the Supplier does not take any remedial action within a period of (7) seven calendar days after receipt of a notice of default from the Purchaser specifying the nature of the default(s), or
  - d. if the Supplier, in the judgment of the Purchaser, has engaged in any corrupt or fraudulent practices in competing for or in executing the tasks under this Purchase Order; and
9. The Supplier shall provide the warranty, as stipulated in the Quotation document, for the goods to be supplied and confirm that if any faults are detected within the warranty period in the supplied/installed goods, the Supplier shall be bound to rectify the fault or replace the goods as the case may be. The security deposit shall be used to cover the cost of supplies not delivered or defective items not replaced or rectified.
10. The purchaser may procure any of the items from the open market in case the supplier fails to supply the goods within the stipulated time and realise the difference amount between the quoted price & market price from the security deposit

	Supplier's Stamp
Signature of Supplier	
Name of Supplier	
Date	

---

**Bid Security (Bank Guarantee)**

*[The Bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated.]* \_\_\_\_\_

*[insert Bank's Name, and Address of Issuing Branch or Office]*

**Beneficiary:** \_\_\_\_\_ *[Name and Address of Purchaser]*

**Date:** \_\_\_\_\_

**BID GUARANTEE No.:** \_\_\_\_\_

We have been informed that *[insert name of the Bidder]* (hereinafter called "the Bidder") has submitted to you its Bid dated (hereinafter called "the Bid") for the execution of *[insert name of Contract]* under Invitation for Bids No. *[insert IFQ number]* ("the IFQ").

Furthermore, we understand that, according to your conditions, Bids must be supported by a Bid Guarantee.

At the request of the Bidder, we *[insert name of Bank]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[insert amount in figures]* (*[insert amount in words]*) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the Bid conditions, because the Bidder:

- (a) has withdrawn its Bid during the period of Bid validity specified by the Bidder in the Form of Bid; or
- (b) having been notified of the acceptance of its Bid by the Purchaser during the period of Bid validity, (i) fails or refuses to execute the Contract Form; or (ii) fails or refuses to furnish the Performance Security, if required, in accordance with the Instructions to Bidders.

This guarantee will expire: (a) if the Bidder is the successful Bidder, upon our receipt of copies of the contract signed by the Bidder and the Performance Security issued to you upon the instruction of the Bidder; or (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of the Bidder's Bid.

Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

\_\_\_\_\_  
*[signature(s)]*



---

## Sample Manufacturer's Authorization

*[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. The Bidder shall include it in its bid, if so indicated in the **BDS**.]*

Date: *[insert date of Bid Submission]*

Invitation for Bid No.: *[insert IFB number]*

*Alternative No.: [insert identification No if this is a Bid for an alternative]*

To: *[insert complete name of the Purchaser]*

### WHEREAS

We *[insert complete name of the Manufacturer]*, who are official manufacturers of *[insert type of Goods manufactured]*, having factories at *[insert full address(es) of the Manufacturer's factory/ies]*, do hereby authorize *[insert complete name of Bidder]* to submit a Bid in relation to the Invitation for Quotation indicated above, the purpose of which is to provide the following Goods, manufactured by us, namely *[insert name and/or brief description of the Goods]*, and subsequently to negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 29 of the General Conditions of Contract, with respect to the Goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the Manufacturer]*

Name: *[insert complete name(s) of the authorized representative(s) of the Manufacturer]*

Title: *[insert title(s) of the authorized representative(s) of the Manufacturer]*

Duly authorized to sign this Authorization for and on behalf of *[insert complete name of the Bidder]*

Dated on the *[insert number]* day of *[insert month]*, *[insert year]*.