To: SUPPLIER

**Alice Holt Research Station**

Alice Holt Lodge

Wrecclesham

Farnham

Surrey

GU10 4LH

Tel 0300 067 5701

mark.oram@forestresearch.gov.uk

11 February 2021

Dear Sir/Madam

**REQUEST FOR QUOTATION FOR SUPPLY and DELIVERY of 7 x MULTISPECTRAL IMAGING, 7 X VIDEO DRONE/SENSORS & ACCESSORIES**

**RFQ REF NO: CR2020/21/048**

You are invited to submit a quotation for the supply and delivery of

* Type 1: seven (7) DJI model ‘P4 Multispectral’ RTK drones (or acceptable equivalent) and
* Type 2: seven (7) DJI model ‘Mini 2’ RGB (or acceptable equivalent) video drones

plus accessories, as more fully described below.

Forest Research is working on the development of improved models to estimate above ground biomass and standing carbon of forest stands; currently this includes the creation of a 3D point cloud model of the entire forest stand (from ground level to canopy top) ([see short video here to illustrate](https://www.youtube.com/watch?v=UoYV-4OztEQ)). A terrestrial laser scanner (GeoSLAM make c/w image data processing software) is used to gather point cloud data from the forest floor which is then combined with point cloud data gathered from above the forest canopy by drones to create the 3D point cloud model.

The Type 1 drones/sensors will be used to capture the above-canopy point cloud data and the Type 2 drones/sensors will provide visual inspection capability (to complement the Type 1 units) and be used for mission/flight planning.

The standard of equipment required (in terms of performance, technical characteristics, features, build quality and compatibility) is defined by the specific make and models of products identified above and your quotation will need to include sufficient information about the equipment you have offered in order for us to make a comparative assessment against the standard.

**Outline drone standards**

**Type 1; DJI model ‘P4 Multispectral’ RTK drones (or acceptable equivalent):**

* Able to be utilised for commercial flights by drone pilots holding GVC + A2COFC (General Visual Line of Sight Certificate) licence.
* Typical flight time of > 25 minutes
* Max’ speed ≥ 50 kph
* Hover accuracy range: Vertical: ± ≤0.1 m; Horizontal: ± ≤0.1 m
* Operating temperature range; 0° to 40° C
* Sensors: Six 1/2.9” CMOS, including one RGB sensor for visible light imaging and five monochrome sensors for multispectral imaging (Blue (B): 450 nm ± 16 nm; Green (G): 560 nm ± 16 nm; Red (R): 650 nm ± 16 nm; Red edge (RE): 730 nm ± 16 nm; Near-infrared (NIR): 840 nm ± 26 nm). Each Sensor: Effective pixels 2.08 MP (2.12 MP in total). The relative positions of the centers of the cameras’ CMOS and the phase center of the onboard D-RTK antenna must be calibrated and are recorded in the EXIF data of each image.
* GNSS (Global Navigation Satellite System); Real-time kinematic (RTK) positioning utilising GPS, BeiDou, Galileo & GLONASS constellations to achieve positioning accuracy: Vertical ≤1.5 cm + 1 ppm (RMS); Horizontal ≤1 cm + 1 ppm (RMS). Velocity Accuracy: ≤0.03 m/s
* Ground sample distance: ≥(H/18.9) cm/pixel, H indicates the aircraft altitude relative to the area mapped (unit: m)
* Photo Format: JPEG (visible light imaging) + TIFF (multispectral imaging)
* Supported file formats: FAT32 (≤ 32 GB), exFAT (> 32 GB)
* Micro SD card compatibility with a max capacity ≥128GB
* Control unit with max transmission distance of ≥3.1 mi (5 km) & integrated display screen, or separate display unit (please specify and include quote for supply and delivery)

**Type 2: DJI model ‘Mini 2’ RGB (or acceptable equivalent):**

* Able to be utilised for commercial flights by drone pilots holding GVC + A2COFC (General Visual Line of Sight Certificate) licence.
* Typical flight time of ≥ 30 minutes
* Max’ speed ≥16 m/s
* Wind speed resistance ≥ 8.5-10.5 m/s (Scale 5)
* Hover accuracy range: Vertical: ± ≤0.1 m; Horizontal: ± ≤0.3 m
* Operating temperature range; 0° to 40° C
* Sensors: 1/2.3” CMOS Effective Pixels: 12 MP
* Photo Resolution: 4:3: 4000×3000, 16:9: 4000×2250
* Video Resolution: 4K: 3840×2160 @ 24/25/30fps, 2.7K: 2720×1530 @ 24/25/30/48/50/60fps, FHD: 1920×1080 @ 24/25/30/48/50/60fps
* GNSS (Global Navigation Satellite System); GPS+GLONASS+GALILEO constellations.
* Photo Format: JPEG/DNG (RAW)
* Video Format: MP4 (H.264/MPEG-4 AVC）
* Supported file formats: FAT32 (≤ 32 GB), exFAT (> 32 GB)
* Micro SD card compatibility with a max capacity ≥128GB
* Control unit with max transmission distance of ≥6 km & integrated display screen, or separate display unit (please specify and include quote for supply and delivery).

Additionally, the proposed make / model of drones that it is proposed to supply to meet the Type 1 and Type 2 requirements (as outlined above) should provide a commonality of operating systems and controls that enhances flexibility and efficiency in equipment use and facilitates more cost-effective pilot/operator training.

Quotes may be submitted for the supply of either or both Types of drone/sensor.

If quoting for the supply of only one of the two Types of drone, the choice of product offered should take account of the benefits (stated above) of having operating systems/controls that are the same as or similar to those of the other specified Type of drone.

If you are unable to supply the full quantity of drones specified, you may submit a quotation for supply of a smaller quantity. However, preference will be given to quotes that offer the full quantity.

The scope of supply includes all image data processing software, mission planning software, flight record keeping software, and the following accessories:

* For the Type 1: 21 x batteries and 7 x in-car chargers for the batteries
* For the Type 2: 21 x batteries and 7 x in-car chargers for the batteries.

Where the operator control units offered do not have integrated display screens, the cost of separate display units (supply, delivery and any app/software) must be included in the quoted price.

Quotations must include a priced, full list of accessories and spares. Details are also required of required or recommended routine servicing/planned maintenance, the charges for such and also for repairs.

The equipment will be used in Great Britain and possibly Northern Ireland and must be compliant with all relevant applicable codes, standard, laws, bye-laws and regulations in those countries.

Other essential characteristics of the required equipment include:

* Fully compatible with the software used for creating the 3D models (processing the point clouds, create mosaics & terrain models), which is developed/supplied by ‘Pix4D’
* Operator control units must either have integrated display screens or be supplied with a separate, but connected, compatible display unit (e.g. mini-tablet, headset).

Software installation / update of control units (& display units if not integrated into control unit) must be achieved via wi-fi connection (with the devices being standalone throughout and not connected to the Forest Research network.

* Control units (and any separate display units, if required) must be readily portable (by hand) and sufficiently rugged to be used in a forest environment.

All equipment is to be delivered to: Forest Research, Alice Holt Research Station, Alice Holt Lodge,

Wrecclesham, Farnham, Surrey, England, GU10 4LH.

Delivery is required no later than 31 March 2021 (\* please refer to ‘conditions’ listed below).

Please send your quotation and any enquires about this invitation by email to Mark Oram.

Email: mark.oram@forestresearch.gov.uk

Phone: 0300 067 5701 / 07771 810270

Your quotation, incorporating the requirements specified below, must be submitted by email by **09:00hrs on Thursday 18th February 2021.**

Quotations will be evaluated as detailed in the Evaluation Matrix below, and the selected quote/supplier chosen accordingly.

Please note the following conditions:

* Any contract concluded as a result of this RFQ shall be governed by English Law and the Forestry Commission’s Standard Terms and Conditions will apply[[1]](#endnote-1). Your terms will not apply.
* \*Delivery: It will be a condition of any purchase order or contract issued in relation to this RFQ that in the event of delivery of Goods after 31 March 2021, Forest Research shall have the right to refuse the Goods and will have no obligation to pay for them and in such event the Goods will be collected by the Supplier or returned at the Supplier’s expense, and Forest Research will have no liability to pay any costs, losses, expenses or charges, including loss of profit or opportunity, incurred or suffered by the supplier or any third party resulting directly or indirectly from such refusal of the Goods.
* The quotation and all accompanying documents are to be in English.
* Forest Research reserves the right to cancel or withdraw from the process at any stage.
* Forest Research does not undertake to accept the lowest priced quotation, or part or all of any quotation.
* All information supplied to you by Forest Research must be treated in confidence and not disclosed to third parties.
* Once the contract has been awarded/purchase order has been issued, any additional costs incurred which are not reflected in the quotation will not be accepted for payment.
* Offering an inducement of any kind in relation to obtaining this or any other contract with the Forestry Commission will disqualify your quotation from being considered and may constitute a criminal offence.

Yours faithfully

Mark Oram

Quotation Requirements

* All details of your quotation, including prices, must remain valid and open for acceptance for a period of 30 days from the date of submission.
* Quoted prices must be fixed, quoted in GBP and exclusive of VAT.
* Prices must be supplied on a DDP (Incoterms) basis, and clearly stated in your quotation to be so.
* Quoted prices are to be based on the following payment terms:

The Price shall become payable on delivery of the Goods and payment of invoice will be made within 15 days of receipt of invoice (the invoice to be submitted no later than the day of delivery of the Goods).

* You are required to include a fully itemised breakdown of your quoted price.
* Your quotation must include confirmation of the scope of supply and a full product specification for the Goods offered (including for any options or extras offered), and a priced Recommended Spares List
* State clearly the lead time (the time to deliver the Goods from receipt of order) and also the date by which you would require to receive a purchase order in order to achieve delivery by 31 March 2021. Your quoted price should be based on your best (quickest) delivery.
* In your quotation please identify
	+ the length and scope of the product warranty/guarantee offered (and included for in your quoted price) and
	+ any extended warranty available and the price for this.
* In your submission you should describe what, if any, after-sales services and support you provide.

Evaluation Matrix

|  |
| --- |
| **Combination of Price and Other Criteria** |
| **Type 1 Drone** |
| **Criteria** | **Weighting** | **Scoring System** |
| 1. Price:- 7 x Drone c/w control units- 21 x batteries- 7 x car chargers- 7 x separate display units (if not incorporated into drone control unit).- Supply of recommended spares holding  | 45% | Price will be evaluated using the ‘standard differential method’ – each party submitting a quote receives 100% of the available marks less the percentage by which their tender is more expensive than the lowest; with 4 being the maximum score achievable. |
| 2. Extent to which the proposed equipment meets the standards and requirements specified in this RFQ. The quotation will need to include sufficient information about the equipment to enable it to be compared to the standards and requirements described.Equipment offered should meet or exceed the specified make/model’s technical or performance characteristics in respect of * Portability
* Build quality (materials and construction)
* Flight – time/duration, speed, range
* Mapping/data collection – volume/quantity, quality, accuracy
* GNSS RTK – accuracy/reliability
* Vision – range
* Imaging (sensors, cameras) – multispectral, quality, resolution, range, size (image), formats
* Commonality of operating controls/systems between the two Types of drones

Equipment offered will need to achieve compliance with the requirements specified in respect of:* Compatibility of image data processing (systems/software)
* Can be commercially operated under a GVC + A2COFC (General Visual Line of Sight Certificate) licence.
 | 40% | Score between 0 (low/min) and 4 (high/max).0 – No response or totally inadequate responseNo response or an inadequate response1 – Major Reservations/ConstraintsThe response simply states that the party submitting a quote can meet some of the requirements set out in the question or statement of requirements, but have not given information or detail on how they will do this2 – Some Reservations/ConstraintsThe party submitting a quote has provided some information about how they propose to meet most of the requirements as set out in the question or statement of requirements. There is some doubt in their ability to consistently meet the full range of requirements3 – Fully CompliantThe party submitting a quote has provided detailed information covering all elements of the question, detailing how they propose to meet all the requirements as set out in the question or statement of requirements. This gives full confidence in their ability to consistently meet the full range of our requirements4 – Exceeds RequirementsThe party submitting a quote meets the required standard in all respects and exceeds some or all of the major requirements, which in turn leads to added value within the contract |
| 3. Length and scope of the ‘standard’ product warranty or guarantee included in the quoted price | 5% | Score between 0 (low/min) and 4 (high/max) depending on nature of warranty/guarantee each supplier has included in the price. Sore 0 if no response or no warranty/guarantee offered in the quoted price; score 4 for an extensive & lengthy warranty with comprehensive cover including accidental damage, all parts and labour, and repair or replacement with new, included in ‘standard’ price |
| 4. Is extended warranty available and what is the price for this? | 3% | Score between 0 (low/min) and 4 (high/max) depending on the nature of the extended warranty/guarantee and how costly (this will be considered in conjunction with the nature of the standard warranty offered). Score 0 if no response or no extended warranty offered.Score 4 if an extended warranty is offered in addition to a good standard warranty and at a comparatively low price |
| 5. Maintenance and repairs | 5% | Score between 0 (low/min) and 4 (high/max) depending on the level of routine servicing and preventative maintenance the drones/sensors require (frequency, downtime, logistics), the costs/charges for servicing/maintenance and for repairs (breakdown and damage), response times/service levels, and any links to the warranties offered (conditional warranty). |
| 6. Any options or extras offered | 2% | Score between 0 (low/min) and 4 (high/max) depending on the number, nature and cost of the options/extras, where 0 = no options or extras offered and 4 = a number of affordable options or extras offered that have real added value |
| **Type 2 Drone** |
| **Criteria** | **Weighting** | **Scoring System** |
| 1. Price:- 7 x Drone c/w control units- 21 x batteries- 7 x car chargers- 7 x separate display units (if not incorporated into drone control unit).- Supply of recommended spares holding  | 45% | As 1. above |
| 2. Extent to which the proposed equipment meets the standards and requirements specified in this RFQ. The quotation will need to include sufficient information about the equipment to enable it to be compared to the standards and requirements described.Equipment offered should meet or exceed the specified make/model’s technical or performance characteristics in respect of * Portability
* Build quality (materials and construction)
* Flight – time/duration, speed, range
* Mapping/data collection – volume/quantity, quality, accuracy
* GNSS – accuracy/reliability
* Vision – range
* Imaging (sensors, cameras) –resolution, range, size (image), formats
* Commonality of operating controls/systems between the two Types of drones

Equipment offered will need to achieve compliance with the requirements specified in respect of:* Compatibility of image data processing (systems/software)
* Can be commercially operated under a GVC + A2COFC (General Visual Line of Sight Certificate) licence.
 | 40% | As 2. above |
| 3. Length and scope of the ‘standard’ product warranty or guarantee included in the quoted price | 5% | As 3. above |
| 4. Is extended warranty available and what is the price for this? | 3% | As 4. above |
| 5. Maintenance and repairs | 5% | As 5. above |
| 6. Any options or extras offered | 2% | As 6. above |

1. The Forestry Commission’s Purchase Order Terms and Conditions (Rev 4th October 2019), which are embedded here (click to open and view or print)

 [↑](#endnote-ref-1)