

Office of the: Divisional Forest Officer, Core Area, Tiger Project, Palamau

Expression of interest

Expression of interest from academic / technical institution of national/international repute for providing solutions for UAV surveillance

(Design, Implement and support UAV surveillance System for Betla National Park, Jharkhand)

The key objective of the system will be to reduce man animal conflict and poaching with minimal human intervention and to develop algorithms based on machine learning to achieve this goal. The interested institution is expected to take full responsibility of providing One unit of Hexa Copter along with one visual daylight camera and one thermal camera with following technical specifications; operating the system for one year and developing solutions to reduce man animal conflict, poaching and illegal entries with minimum human intervention using algorithms based on machine learning.

Technical Specifications of the UAV (One unit of Hexa Copter):

- Flight time – 75 minutes with standard payload of 3 Kgs.
- Maximum payload of over 15 Kgs
- Max Speed required – 15 m/s.
- Robustness - ability to withstand adverse weather conditions: Rain, wind tolerance of 9m/s, temperature tolerance range: 0°C to 55°C
- The UAV must be equipped with GPS RTK and should be capable of doing autonomous missions
- Failsafe options for “out of range”, “battery low” or Bad weather like rain are must. System should provide RTL (return to launch) in such case
- Positioning accuracy : Horizontal – 1 cm + 1 ppm, Vertical – 2 cm + 1 ppm

Visual Daylight Camera Requirement: -

- Minimum camera resolution – 3840 x 2160
- Min optical zoom for camera – 20X (digital zoom should not be counted in this)
- Camera zoom should be controllable from Ground station application
- Weight of the camera should be below 750 gms
- Camera should be controllable from Ground station application
- Camera should provide live view down to ground station
- Camera should always record full resolution video on board the camera irrespective of the view

Thermal camera requirements: -

- Resolution: 640 x 512
- Operating Temperature Range: -0°C to +50°C
- Pitch angle range: -90° to +90°, controllable from ground
- Rotating angle range: -50° to +50°, controllable from ground

- Heading angle range: -150° to $+150^{\circ}$, controllable from ground
- Modes – Black hot, Red hot and White hot

Operational specifications: -

- Minimum one year of onsite support must be provided for operational and training purposes. At least one person should be deployed onsite at Palamu Tiger Reserve. This period is in addition to any installation period that might be required. So, this support period starts from the day when all systems are operations
- All equipment should be accurately rated in terms of its flight time life/ operational life and warranty in the bid.

Research and Development Intention: -

- The key objective of research will be to reduce man animal conflict, poaching and illegal entries with minimal human intervention and to develop algorithms based on machine learning to achieve this goal.
- Early detection of forest fires and development for alarm systems for the same purpose.
- The institution can collect the surveillance data and can also maintain a presence in the forest by sending experts to the Reserve from time to time.

The interested institution shall also quote an amount(tentative) for the whole package of the work defined above for one year and the cost for subsequent one year.

The last day for submission of proposal is 16.03.2017.

**Divisional Forest Officer,
Core Area, Tiger Project, Palamu**