To,

The DsG: AR/BSF/CRPF/CISF/ITBP/NSG/SSB

Subject: QRs/Specification of Unmanned Aerial Vehicle (UAV)

Sir,

I am directed to forward herewith the QR/Specification of the Unmanned Aerial Vehicle (UAV), as per annexure, approved by the competent authority for further needful.

(S.B. Nanda)
Under Secretary (Prov-I)

Encl:- 06 Leaves

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1. DD (Procurement)
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Copy also to :-

1. NIC, MHA, North Block, New Delhi- for publishing in MHA, website.

Issued dated 6-2-12

From: Box: 1-10
BSF 1-10
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LoAP 1-12
NSG 12-07
SSB 08-09
QRs UAV

1. The specification/parameters outlined in succeeding paragraphs represent attainable objectives for UAV for use by the Central Armed Police Forces (Excluding NSG) are laid out under following heads:-
   (a) The UAV as a system.
   (b) Physical characteristics.
   (c) Operational characteristics including payload.
   (d) Maintenance and Administrative back up.

2. The performance related attributes are with reference to environmental conditions and terrain features including urban obtaining in India.

UAV as a System:

3. The UAS should consists of :-
   (a) The Aerial Vehicle (Fuel/battery operated).
   (b) Day and Night payloads.
   (c) Portable Ground Control Station (PGCS).
   (d) Launch and recovery system.
   (e) Compact remote video terminal (RVT) or a wrist mountable video gadget (Optional item.)

4. The UAS as a system should consist of two or more UAVs with one to two MPGCS, one to two RTV (Portable) receivers (Video) and adequate spares along with the necessary storage and carriage paraphernalia.

Physical Characteristics

5. **General**
   (a) The UAV should be simple, compact, light weight modular with a rugged and proven design.
   (b) The UAV should be capable of rapid deployment with a detachment not exceeding two to three men.
   (c) The UAV should have all weather day and night operations capability.

6. **Endurance:** The UAV should have a minimum endurance of three more hours with maximum payload at sea level.

7. **Mission Range:** The mission range should be a minimum of 15 km and above.

8. **Weight and External Dimensions:** The weight with payload in Day/Night configuration should not exceed 25+2 Kgs. The UAV should have dimensions commensurate to its weight, speed and endurance as well such that it should ensure easy handling and transportation by vehicles and aircrafts. It should be packable in two dedicated back packs.
9. **Speed**: The UAV should be able to operate even in windy conditions of maximum speed 20 Knots during take-off, landing or while during flight and with facility for locational hover.

10. **Standard Operating Altitude**: 3000 to 5000m to cater to the needs of the operational areas of high altitude.

11. **Operating Temperature and Rain**: Minus 20 degrees centigrade to plus 50 degrees centigrade and quick rate of climb and descent. Operable in light rain upto 6mm/hour.

12. **Storage**: Minus20 degree to plus 55 degrees centigrade.

**Operational Characteristics:**

13. **Reconnaissance and Surveillance**: The UAV should be capable of carrying out all weather day and night real time reconnaissance and surveillance of an area of Interest. For this, AV should transmit real time imagery of a high quality resolution to the GCS.

14. **Target Detection, Recognition, Identification and Acquisition**: The system must be able to detect and acquire the designated targets. The sensor packages must provide a high quality Imagery resolution to permit target detection, recognition, Identification and accurate location of fixed targets, move of personnel and vehicles. The UAV must be capable of being deployed from a 20’ x 20’ clear space and operated in forest areas during CT/CH operations.

15. **Air Vehicle (AV)**: The AV should be easy to handle and should have low heat, low noise which is inaudible at 100 m and low radar signatures to avoid detection and engagement by adversary. Air frame should be made of composite material of any other strong rugged light weight material and be rugged, durable and robust. The parts should be modular and easy to replace and maintain. It should have suitable secure datalink capability to communicate with MPGCS. Fitment, removal and replacement of sensors should be quick and simple easily executable in field conditions.

16. **Propulsion**: The UAV is to be powered by appropriate fuel- efficiency internal combustion engine or electrically operational system. The aural signature vibration level of the engine should be low for optimal functioning of equipment onboard and should have operational survivability.
17. **Portable Ground Control Station (PGCS):** The PGCS should be based on the GPS and it should be able to control all aspect of UAV system operation like pre-flight checks, equipment self tests, take off/landing control of AV and payloads. It should have advance mission planning and data analysis software features. It should provide secure communications for AV control and tracking, sensor operation and navigation. The PGCS should be based on ruggedized portable computers and should be capable of operating in a standalone mode. It should facilitate recording and replay of sensor data. To enable transmission of Intelligence/Information obtained to the other users from the PGCS. In the form of video freeze frames/video clipping requisite equipment such as composite software/modem should be incorporated in the PGCS. The facility of viewing live Imagery at remote video terminal (Laptop version and palm top versions or wrist mounted display) should be provided. It should be able to control the payload in manual mode with a control box, to cater for autopilot failure. The PGCS should have the following:-

(a) Power supply system should cater for at least five hours of continuous operation with adequate back up.

(b) The instrumentation should have trackball/joystick/touch screen controls for operating various flight control modes and payloads and a Ruggedized keyboard.

(c) Digital Mass storage for recording live Imagery along with metadata/telemetry and still Image date received from the sensor and mission flight data for post flight analysis capability. Capacity should be minimum 12 hours of recording data of multiple missions in MPEG4 format. Data transfer of recording to be downloadable to external storage and display systems by operator.

(d) Self test facility for PGCS.

(e) Compact RVT or wrist mountable video gadget.

(f) Should have ability to overlap the ground video data with geo-spatial data available.

18. **Data-Link for UAV:** The UAV should have a suitable data uplink and telemetry and video down link with MPGCS with a range of at least 50 Km LOS. The data link (Uplink and downlink) should be secure jam resistant and should enable automatic tracking of AV in flight to minimize loss of communication link. Flexible spectrum with options in S/C band with 16 Independent channels each with either single or 16 frequency hopping in both bands should be made available. The frequency band of the data link needs to cater for simultaneous operation of a minimum 02 UAVs (RW) and 02 GCs in close vicinity of 205 Sq Km without mutual interference.
Operate successfully despite intermittent presence of in-band signals from other RF systems.
Operate successfully despite deliberate attempts of jamming the up or down link.
Rejects attempt by an enemy to send commands to the air vehicle to prevent AV from crash, redirections/deviations.
Since users never prefer link loss between air vehicle and Ground control Stations during real time operations, both telemetry data and video link should be well established.

19. **Programmed Flight Capability:** The UAV should have a facility of launching on a pre-programmed flight. The system should have dynamic programming in flight to provide flexibility for multi-mission planning. Slaving the UAV flight pattern to the payload LOS observation point so as to optimize payload image of the target should be permissible. The system should be capable to store a minimum of 100 flight routes and each route may have minimum of 25 points so that the ground forces don’t deviate from the routes to be undertaken in case of larger distances. The meteorological data for mission preparation should be configurable. The programming should also cater for loiter patterns in the target area. The system must have ‘Manual Override facility or should be reconfigurable to permit over-ride of a pre-programmed flight at any time during the mission. GPS data should be integrated with data from mission specific sensors. In case of emergency/break in communication during the flight, the system should automatically change to programmable ‘return Home mode, till the communication gets re-established.

20. **Safety:** In case of emergency/break in communication during the flight, the system should automatically change to programmable ‘Return Home’ mode, till the communication gets re-established. In case of loss it should give a radio beacon which would assist its recovery.
21. **Payload:** The payload should provide both day-night capabilities to the UAV. It should be capable of providing real-time high-quality video with full flight telemetry and capable of tracking ground targets, both static and mobile.

22. **Stabilisation of Sensor:** The sensor should be stabilized cameras capable of high-quality imagery and also to ensure auto-locking and tracking of the selected targets.

(a) **Sensor Mounting:** Sensors should be mounted on adaptive modular payload platform and located at such a place where it should not sustain damage during rough landings. The mounting should have electrical/mechanical and software interfaces to accept other modular payload:

(b) **Sensor:**

(i) Day CCD colour sensor with FOV of wide > 45° and narrow < 5.5° and zoom 10x (as per market availability for better image/video resolution).

(ii) Standard Monocular uncooled FLIR Video Camera with FOV of > 15°

Zoom: 3x

(c) **Resolution:** The resolution should be such that human targets are detected and identified at 500-m range.

(d) | Criteria       | Vehicle | Group of People |
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<tbody>
<tr>
<td>Detection</td>
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<td>Recognition</td>
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<tr>
<td>Identification</td>
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23. **Compact Remote Video Terminal:** The Compact Remote Video Terminal (CRVT) should be capable of being tuned to the UAVs downlink frequency.
It should be light weight and portable computer based and be capable of the following:
(a) Display payload output received from mission UAV,
(b) Record, play back and freeze the imagery and real time printing/editing of Imagery received from UAV.

24. **Launch and Recovery:** UAV capable of landing on unprepared ground or in open clearing and should be launch able from a 20’ x 20’ space.

25. **System Accuracy:** The altitude accuracy should be better than 30’ and the target acquisition accuracy in guided flight should be less than 100cm. The hit probability (% to avoid deviation from the routes/target.

26. **Manoeuvrability:** The UAV should have good manoeuvrability to carry out its mission.

27. **Ease of Operation:**
(a) The system should be easily transportable and be man portable in dismantled configuration in back packs.
(b) The UAV should have an inherent simplicity in launching, flight programming, basic operation and recovery.
(c) It should be possible to deploy within 20 to 30 minutes to respond to a mission request: from transportable condition and with two to three men team.
(d) It should be operable from within armoured vehicles.

28. **Miscellaneous**
(a) The warranty period of the UAV shall be according to the life of the equipment.
(b) The force personnel shall be imparted onsite training for proper handling/operation/minor repair of the UAV.

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Anil K. Gautam, DIG (ITBP)

P.R. Kumar, DC (BSF)

Manoj Kumar Sengar, DC (CRPF)

A.K. Shukla, AC (CISF)

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S. M. Hasnain, DIG (CRPF)

Arun Kumar, DC (Assam Rifles)

A.C. Tripathi, DCIO (IB)

T.H. Vinod Kr. Singh, AC (SSB)

K. Vijay Kumar, DG (CRPF)

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19(Cow)
No. S.II.1/2010-11-Prov-Ord-II(UAV QR)-MHA-Prov-I
Government of India/Bharat Sarkar
Ministry of Home Affairs/Grih Mantralaya
26, Man Singh Road, Jaisalmer House
New Delhi, the 21st May, 2013

To,

The DsG : AR/BSF/CISF/CRPF/ITBP/NSG/SSB

Subject : Amendment in the existing QRs/Specification of Unmanned Aerial Vehicle(UAV).

Sirs,

In partial modification of this Ministry’s letter of even number dated 2-2-2012, the following amendment/revision is made with the approval of the Competent Authority :

<table>
<thead>
<tr>
<th>Para 10 under Physical Characteristics</th>
<th>Existing Specification</th>
<th>Amended Specification</th>
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<tbody>
<tr>
<td>Standard Operating Altitude : 500 m to 6000 m to cater to the needs of the operational areas of high altitude</td>
<td>Standard Operating Altitude : 500 feet to 6000 feet to cater to the needs of the operational areas of high altitude</td>
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2. The remaining text of the specification for the UAV will remain unchanged.

(Smt. S B Nanda)
Under Secretary (Prov.I)

Copy to :

1. SO, IT Cell, MHA – with the request to host the QRs of UAV on the official website of MHA (under the page of organizational set up, Police Modernization Division) and confirm to this Division. Softcopy is being sent through email also.
2. Dir(Prov.), MHA