

संख्या. पी-63013/216/01/2025/मोड-1/सीसुबल/ 951-62

भारत सरकार, गृह मंत्रालय
महानिदेशालय सीमा सुरक्षा बल
(रसद निदेशालय: आधुनिकीकरण सैल)
(Email-comdtord@bsf.nic.in)
(Fax: 011-24367683)

ब्लाक संख्या . 10,
सीजीओ काम्पलैक्स,
लोधी रोड, नई दिल्ली-03
दिनांक 21 मार्च 2025

सेवा में,

महानिदेशक:- आसाम राईफलस (through LOAR), केन्द्रीय ओद्योगिक सुरक्षा बल,
केन्द्रीय रिजर्व पुलिस बल, भारतीय तिब्बत बोर्डर पुलिस, सशस्त्र सीमा बल,
राष्ट्रीय सुरक्षा गार्ड एवं पुलिस अनुसन्धान एवं विकास ब्योरो

विषय: अनुमोदित गुणात्मक आवश्यकता /परीक्षण निर्देशों का प्रेषण

तकनीकी विशेषज्ञों के उप समूह द्वारा किए गये पुनः सूत्रीकरण एवं महानिदेशक सीमा सुरक्षा बल द्वारा अनुमोदित "Tethered UAV/Drone (HYBRID) के गुणात्मक आवश्यकता/परीक्षण निर्देशों को आपकी अग्रिम कार्यवाही हेतु प्रेषित किया जाता है।

संलग्न : उपरोक्तनुसार

आनन्द सिंह
(आनन्द सिंह तक्षक) 21/3/25
उप महानिरीक्षक (रसद)

प्रतिलिपि :-

- तकनीकी निदेशक**
The Technical Director
राष्ट्रीय सूचना-विज्ञान केन्द्र, नोर्थ ब्लाक,
गृह मंत्रालय, नई दिल्ली
NIC, North Block, MHA
New Delhi, (द्वारा ई-मेल)
(ई-मेल पता : mpsugandhi@nic.in)
: आपसे अनुरोध है कि "Tethered UAV/Drone (HYBRID) उपकरण के सूत्रीकरण किये गये गुणात्मक आवश्यकता/परीक्षण निर्देशों को गृह मंत्रालय की वैबसाईट (MHA website Division of MHA+ - Police Modernization Division- Qualitative Requirements- Qualitative Requirements of Machinery & Eqpt Items with Surveillance item) के अर्न्तगत अपलोड करने का श्रम करे।
- SO (IT), North Block, MHA
(Through E-mail)
(E-mail address: soit@nic.in)
: कृपया उपरोक्तानुसार कार्यवाही करने का श्रम करें।
- तकनीकी विंग, सीमा सुरक्षा बल
: कृपया उक्त उपकरण के गुणात्मक आवश्यकता/परीक्षण निर्देशों को सीमा सुरक्षा बल की वैबसाईट पर अपलोड करने का श्रम करें।
- Sh. Samarth Sharma,
Director Nodal Officer for MHA GeM,
3rd Floor, Jeevan Bharti Building
Conaught Lane, Janpath
Cannaught Place, New Delhi-110001
E-mail:directorcategory13@gem.gov.in
For info with request to upload the approved QRs & TDs of "Tethered UAV/Drone (HYBRID) on GeM Portal. Copy of QRs & TDs is attached with this letter.
- Technology Cell, Ops Dte, FHQ BSF
: वास्ते सूचनार्थ आपके पत्र संख्या-727 दिनांक 10 जनवरी 2025 के संदर्भ में।

फाईल।

QRs & TDs OF TETHERED UAV/ DRONE (HYBRID)

1. Field trial/ technical evaluation of the **Tethered UAV/ Drone (HYBRID)** will be conducted by a Board of Officers (B.O.O.) to be detailed by the competent authority to assess the actual performance of the equipment.
2. All parameters/ specifications mentioned in QRs will be checked and verified by the Board of Officers in accordance with the TDs in the presence of representative of firm.
 - (a) **Physical Checks:-** In this category, specifications of the equipment will be checked physically as per QRs and verified from laboratory test reports of Govt. lab. or DRDO or NABL/ ILAC accredited laboratories or OEM certificates as specified in TDs.
 - (b) **Practical Checks:-** The representative of firm will demonstrate all the stated features/ configurations of the equipment/ system to the Board of officers during field trial.
 - (c) **Submission of Certificates:-** Firm will provide certificates from Govt. lab. or DRDO or NABL/ ILAC accredited laboratory for parameters stated below.
3. These QRs have been formulated for **Tethered UAV/ Drone (HYBRID)** with **generic specifications**.

S/No.	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
1.	<u>TETHERED UAV (HYBRID) to include</u>		
	(a) Aerial Vehicle	Qty: Two (2) A tethered UAV that can also be operated un-tethered with day/ night camera payload for surveillance purpose during day & night. Should be capable to fly while tethered and also to fly independent of tether.	To be physically checked and verified by BOO.
	(b) Mobile System (Vehicular) OR Static System (Vehicular or Static to be decided by user agency)	Qty: One (1) Mobile tethering power base station on 4x4 vehicle containing all elements of tethered UAV including generator set. OR Static System that can easily be mounted on vehicle and dismounted from vehicle including all elements of the systems (within 30 minutes) as and when required.	To be physically checked and verified by BOO.

A collection of handwritten signatures and initials in blue ink, including names like 'Sanjay', 'Dharam', 'Raj', 'Suresh', 'Raj', 'Suresh', 'Raj', 'Suresh', 'Raj', 'Suresh', 'Raj', 'Suresh'.

S/No	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
	(c) Ground Control Station	Yes Qty: One (1)	To be physically checked and verified by BOO.
	(d) Payloads	Integrated Day & Night Camera: 02 nos	To be physically checked and verified by BOO.
	(e) Universal Battery Charger with Power Supply System.	Qty: Two (2) In case of power failure UAV should fly for minimum 15 minutes on battery power.	To be physically checked and verified by BOO.
	(f) Generator Set.	Qty: Two (2) Each generator should provide backup of not less than 6 hours.	To be physically checked and verified by BOO.
	(g) Tether Station With Facility To Automatically Unwind And Wind The Tether Cable	Yes Qty: One (1)	To be physically checked and verified by BOO.
	(h) Tethered and Un- Tethered Mode	Yes. UAV should operate in tethered and also without tethering cable as and when required by the operator	To be physically checked and verified by BOO.
2.	<u>Unmanned Aerial vehicle (UAV)</u>		
	(a) Day & Night operational ability	Yes	To be physically checked and verified by BOO.
	(b) Launch & Landing	Automatic Vertical Take-off and Landing (VTOL) From ground or Static Vehicle and should be able to land on the designated landing place of 10 X 10 meter area or less.	To be physically checked and verified by BOO.
	(c) JSS55555, IP53 and EM shielding	Yes	Firm will submit certificate of Govt. lab. or DRDO or NABL/ ILAC accredited lab.
	(d) Should be able to with stand rough landing.	Payload should not damage during landing of UAV.	To be physically checked and verified by BOO.

A series of handwritten signatures and initials in blue ink are located at the bottom of the page, below the table. From left to right, they include: a signature that appears to be 'Sharma', a signature 'Vijay', a signature 'Kishore', a signature 'Anand', a signature 'Raj', a signature 'Suresh', a signature 'Srinivas', a signature 'Ravi', and a signature 'Ajay'.

S/No	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
	(e) Modular and easy to maintain.	Ease of removal / replacement of parts under field conditions.	To be physically checked and verified by BOO.
	(f) All Up Weight of UAV (excluding weight of tethering cable)	Not more than 20 kg.	To be physically checked and verified by BOO.
	(g) Portability and Operation	<p>The tethered UAV should fly on electrical-mains supply/ Gen Set/ battery operated mounted on a 4X4 vehicle or in static mode. (Vehicular or static to be decided by user agency).</p> <p>When the UAV is flying in Un-Tethered mode it should fly on Lithium based battery having endurance not less than 45 minutes. Both the UAVs should be operable interchangeably as tethered or un-tethered.</p>	<p>To be physically checked and verified by BOO.</p> <p>BOO to check endurance of 45 minutes at AMSL not more than 1000 meters in case of Un-Tethered mode.</p>
	(h) Deployment Time	≤ 30 Minutes	To be physically checked and verified by BOO.
	(i) Parking Height	Minimum 120 meters with cable of 150 meters	To be physically checked and verified by BOO.
	(j) Wind Tolerance	20 Knots or better	Firm will submit OEM certificate.
	(k) Propulsion	<p>(i) Electric power to the tethered UAV should be provided by</p> <ul style="list-style-type: none"> • Electric mains supply • Universal battery charger with power supply system and • Through generator set tethered to the UAV by a sturdy power cable. <p>(ii) Electric power to the un-tethered UAV when flying in un-tethered mode should be provided by lithium based battery having endurance not less than 45 minutes: time taken to charge the battery from zero charge to full charge shall not be more than 2 hours 30 min/150 minutes.</p>	To be physically checked and verified by BOO.

A series of handwritten signatures and initials in blue ink are located at the bottom of the page, below the table. From left to right, they include a large signature, a signature with a box, a signature with 'Ditenseed', a signature with 'Thana', a signature with 'B.K.', a signature with 'RA', a signature with 'she', a signature with 'Suresh', a signature with 'A', and a signature with 'Wdf'.

S/No	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
	(l) Operational Endurance	(i) Tethered UAV: Not less than 8 hours. Generator Set: Not less than 6 hours. Changeover facility from 1 st generator set to 2 nd generator set without interrupting the mission of tethered UAV. Cool down time of tethered UAV, not more than 2 hours. and (ii) Un- tethered UAV: Endurance of 45 minutes with minimum hover time of 15 minutes at 5 Km range with max payload up to launch altitude of 1000 meter above mean sea level.	To be physically checked and verified by BOO.
	(m) Range (When The UAV Is Flying Independent Of Tethering Cable)	Not less than 5 Kilometres LOS In Un-Tethered Mode	To be physically checked and verified by BOO.
	(n) Max Cruising Speed (When The UAV Is Flying Independent Of Tethering Cable)	30 km per hour or better In Un-tethered mode	To be physically checked and verified by BOO.
	(o) Aural Signature (When The UAV Is Flying Independent Of Tethering Cable)	< 40dB At 500 meters In Un-Tethered Mode	To be physically checked and verified by BOO.
	(p) Flight Modes	(a) Fully Autonomous Target Tracking & acquisition. (b) Semi-Autonomous Target Tracking & acquisition. (c) Hover. (d) Return to home and land on an area of not more than 10m x 10m. (e) AI (Optional)	To be physically checked and verified by BOO.
	(q) RTK supported	UAV should have RTK supporting hardware and software	To be physically checked and verified by BOO.
	(r) GCS Controlled LED light Night Recovery Beacon (Optional – Laser Pointer/ illuminating	Yes	To be physically checked and verified by BOO.

S/No	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
	focus light)		
	(s) Operational Altitude for the whole system	0 to 4500 meters (AMSL)	Firm will submit OEM certificate.
	(t) Operational Altitude for the Un-Tethered UAV	Minimum Operational Altitude: 1000 meters AGL (Above Ground Level) or more In Un-Tethered Mode	To be physically checked and verified by BOO.
	(u) Operational Temperature and Climatic Conditions	(a) Range: -20 ⁰ to + 55 ⁰ C (b) Ability to withstand dust, drizzle and humid conditions	Firm will submit certificate of Govt. lab. or DRDO or NABL/ ILAC accredited lab.
	(v) Fail safe	Automatic return to home & landing (a) Under low battery condition and power failure (b) Under communication failure (c) Under GPS failure. Multiple GPS for failure redundancy. (d) Should support power line failure/ Generator failure and seamless switching to backup battery (e) High wind and high temperature indication	To be physically checked and verified by BOO.
	(w) GNSS Capability	GPS, GLONASS, Galileo, NAVIC	Firm will submit certificate of Govt. lab. or DRDO or NABL/ ILAC accredited lab.
	(x) Follow Me Mode	UAV should follow the vehicle as it moves to cover larger areas for surveillance. As the vehicle moves, UAV should follow in the direction and speed of vehicle at a min speed of 15km/hr or more in un-tethered mode.	To be physically checked and verified by BOO by driving the vehicle not more than 15km/hr.
	(y) Redundancy	On board Redundancy for Tether Failure	To be physically checked and verified by BOO.

S/No	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
3.	Payload		
	(a) EO/ IR Camera	(a) Integrated Camera for day and Night (b) Gyro Stabilised (c) Locking and auto tracking of the selected target in the video imagery.	(a) To be physically checked and verified by BOO. (b) Firm will submit OEM certificate. (c) To be physically checked and verified by BOO.
	(b) DRI/ Operating Range (For Human)	DRI for Human (group of 3-4 people) Day: Detection - 2500 meters Recognition - 1500 meters Identification - 1000 meters Night: Detection - 750 meters Recognition - 500 meters	To be physically checked and verified by BOO.
	(c) Resolution	(a) Day - 1920 x 1080 Pixels or better (b) Night - 640 x 512 Pixels or better	Firm will submit certificate of Govt. lab. or DRDO or NABL/ ILAC accredited lab.
	(d) Zoom	(a) Day- Optical zoom- 30X or more Digital zoom- 2X or more (b) Night- Digital zoom- 4X or more	Firm will submit certificate of Govt. lab. or DRDO or NABL/ ILAC accredited lab.
	(e) Black/ White Hot Modes or more templates for night camera	Shall Have Black/ White Hot Modes or More Templates for Night Camera	To be physically checked and verified by BOO.
	(f) FOV	$\leq 5^\circ$ (Narrow) to 45° (Wide)	Firm will submit OEM certificate. - BOO to cross check trial results with footage provided by vendor & report correctness/ discrepancy
	(g) Traverse and Tilt	(a) 360° Pan (b) 0° to 90° Tilt up and down	To be physically checked and verified by BOO.
	(h) Stability	(a) Gimbal stabilized (b) Video Output quality should be free from vibration of Aerial Vehicle	To be physically checked and verified by BOO.

Signature



Prithvi

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S/No.	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
4.	<u>Ground Control Station</u>		
	(a) Video	Should be able to stream live video from UAV camera	To be physically checked and verified by BOO.
	(b) Rugged and Robust.	Yes	To be physically checked and verified by BOO.
	(c) Processor	MIL STD 810G, Intel core i7 with latest generation or better	To be physically checked and verified by BOO.
	(d) Mil-STD 810G or better	Yes	Firm will submit certificate of Govt. lab. or DRDO or NABL/ ILAC accredited lab.
	(e) Screen and Keyboard	Minimum 14". Resolution: 1920X1080 pixels Sunlight Readable Screen, Minimum 1000 nits, antiglare	Firm will submit OEM certificate.
	(f) Should be able to overlap ground data with Geo-Spatial data	Yes	To be physically checked and verified by BOO.
	(g) Ability to take screenshots, record and instant playback	Yes	To be physically checked and verified by BOO.
	(h) Storage and RAM	1 TB Digital Mass Storage with 16 GB RAM or better	To be physically checked and verified by BOO.
	(i) Interface and Data Portability	Availability of USB, HDMI, Ethernet (10/100/1000), IEEE, 1394A and wireless connectivity ports for transfer/ exchange of data	To be physically checked and verified by BOO.
	(j) SDI/ APK interface for Integration with command and control centre	Should support integration with Command and control centre and OEM should provide necessary SDI/ APK permissions for the same.	Firm will submit OEM certificate.
	(k) Capability to store Flight Routes and Waypoint Configuration	Capacity to store 100 or more flight routes with 70 way point configuration in each route	To be physically checked and verified by BOO.
	(l) Full Camera Control	Yes	To be physically checked and verified by BOO.

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S/No.	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
	(m) Pan/ Tilt	Yes	To be physically checked and verified by BOO.
	(n) Zoom In/ Out	Yes	To be physically checked and verified by BOO.
	(o) Altitude Control	Yes	To be physically checked and verified by BOO.
	(p) Locking and Tracking of Target	Yes	To be physically checked and verified by BOO.
6.	Capability		
	(a) Geographical map along with UAV location	Yes	To be physically checked and verified by BOO.
	(b) Transmit control commands to UAV	Yes	To be physically checked and verified by BOO.
	(c) Receive UAV flight and propulsion parameters	Yes	To be physically checked and verified by BOO.
	(d) Receive, Display and Record real time day & night video from AV	Yes	To be physically checked and verified by BOO.
	(e) Capability to control UAV while on the move	Yes	To be physically checked and verified by BOO.
7.	Software		
	User friendly software with at least following mission information (a) Target coordinates (b) GPS Accuracy ± 10 meters (c) UAV Position and distance from GCS (d) UAV operating data (e) Wind speed (f) Mission time (g) Payload looking angle (h) Communication link status (i) GPS status (j) Battery status (k) Auto tracking	Should be able to perform and display all the characteristics.	To be physically checked and verified by BOO.

A collection of handwritten signatures and initials in blue ink, including names like 'Sankar', 'Dipankar', 'Ananta', 'Raj', and 'Sudip', along with various initials and marks.

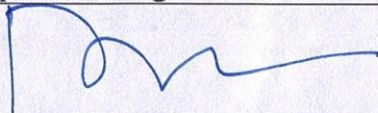
S/No.	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
	(l) Geographic map and real time video should be displayed at all times during the flight (m) Capability to zoom/ tilt/ rotate maps (n) Geographical map and real time video views should be resizable and switchable to allow user to switch between big map/ small video and small map/ big video views through a single click/ button input		
8.	Map Format		
	(a) Capacity to integrate all kind of Geo-Referenced Raster Maps in commonly used digital formats (GIF, TIFF, DTED & SRTM etc)	Yes	Firm will submit OEM certificate.
	(b) Compatibility to integrate Google Map and download map of specific location	Yes	To be physically checked and verified by BOO.
9.	Communication Link		
	(a) Secure, between Aerial Vehicle and Ground Control Station with minimum 256-bit encryption in Un-Tethered mode.	Yes	Firm will submit OEM certificate.
	(b) Operable S-band and C-band frequency for uplink and downlink preferably on license free band i.e 2.4 or 5.8GHz or any other band as per user requirement.	Yes	Firm will submit OEM certificate.
	(c) Transmit control commands from GCS to UAV	Yes	To be physically checked and verified by BOO.
	(d) Transmit parameter of UAV and Payloads to GCS	Yes	To be physically checked and verified by BOO.
	(e) Transmit day and night video from UAV to GCS.	Yes	To be physically checked and verified by BOO.

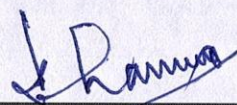
S/No.	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
	(f) Jam Proof Communication (Desirable) in case of tethered mode.	Yes	Firm will submit OEM certificate.
	(g) Non ISM band	Optional	Firm will submit certificate of Govt. lab. or DRDO or NABL/ ILAC accredited lab.
10.	<u>Payload Control</u>		
	(a) Selection and switch on/ off of payload	Yes	To be physically checked and verified by BOO.
	(b) Pan/ Tilt/ Zoom Control	Yes	To be physically checked and verified by BOO.
11.	<u>Video</u>		
	(a) Video should be recorded in any commonly portable video formats (AVI/MPEG/MP4 etc)	Yes	To be physically checked and verified by BOO.
	(b) Video of the full flight should be recorded	Yes	To be physically checked and verified by BOO.
	(c) Should have capability to take image snapshots at any time during flight	Yes	To be physically checked and verified by BOO.
12.	<u>Tethering Power Base Station, Tether Cable And Battery</u>		
	(a) Mobility- in case of a mobile system	Should be mounted on a 4X4 vehicle with all elements of tethered UAV along with Generator Set	To be physically checked and verified by BOO.
	(b) Input Voltage	100 to 270V	To be physically checked and verified by BOO.
	(c) Generator Set: 2 Nos	Each Generator set shall be able to run the complete system for not less than 6 hours i.e. complete system shall run for 12 hours non-stop on both the generator sets without interrupting mission.	To be physically checked and verified by BOO.
	(d) Battery/ Number of batteries/ Battery Life	Lithium based Battery for UAV to fly in Un-Tethered mode. Spare Battery: Two spare batteries on each UAV in case of a single battery. Otherwise two spare set of batteries depending upon the number of batteries	To be physically checked and verified by BOO.

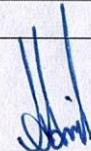
S/No.	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
		required to fly UAV in un-tethered mode. Battery Life: 3 Years or 300 charging cycles whichever is earlier	
	(e) Wire Winch System	Automatic cable winding and unwinding	To be physically checked and verified by BOO.
	(f) Display	Parameters such as Output/ Input voltage should be displayed	To be physically checked and verified by BOO.
	(g) Ventilation System	Should have ventilation cooling system to avoid system overheating	To be physically checked and verified by BOO.
	(h) Length	150 meters or more	To be physically checked and verified by BOO.
	(i) Tensile Strength	50 Kilograms or more	To be physically checked and verified by BOO.
	(j) Insulating Covering	Should be of insulating material to avoid electrical shock	To be physically checked and verified by BOO.
13.	Pre - flight checks		
	Self-test of AV system, Output	go/ no go	To be physically checked and verified by BOO.
14	EM shielding of System and Sub-Systems including power cable and tethering cable.	The complete system should be EM shielded.	To be physically checked and verified by BOO. and Firm will also submit OEM certificate.
15.	Miscellaneous Terms		
	(a) Comprehensive Warranty including applicable Taxes and Duties	2 Years on site from the date of JRI	Firm will submit OEM certificate.
	(b) Total Technical life	5 Years	Firm will submit OEM certificate.
	(c) Product support after warranty	3 Years comprehensive on site CAMC including additional MRLS, taxes and duties Training of operators @minimum 5 per UAV Software: Auto update facility	Firm will submit OEM certificate.

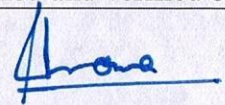
A series of handwritten signatures and stamps in blue ink are located at the bottom of the page. From left to right, there is a signature, a square stamp with the letters 'JSA', another signature, the word 'Witnessed' followed by a signature, a signature with 'Keto' written above it, a signature with 'RE de' written above it, a signature with 'check' written above it, and two more signatures on the far right.


S/No	Parameter	Qualitative Requirement/ Technical Specifications	Trial directives
16.	Accessories		
	(a) Manuals (User, Technical, Maintenance)	Yes (01)	To be physically checked and verified by BOO.
	(b) Field Repair Kit	Yes (01)	To be physically checked and verified by BOO.
	(c) Spare Landing Gear Sets	One (01)	To be physically checked and verified by BOO.

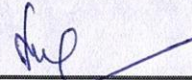

(Puneet Rastogi), IPS, ADG (Log), BSF



(K M Prasad), DIG (SIW), BSF



(S S Rathore), DIG, OPS Dte (Tech Cell), BSF



(Happy Verma), Comdt (Ord), BSF

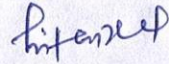

(Lt Col Nirbhay Singh Rana), Assam Rifle

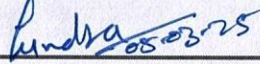

(Mukesh Kumar), 2IC (SIW), BSF



(Rajeev Bhatt), SSO, BPR&D (through VC)

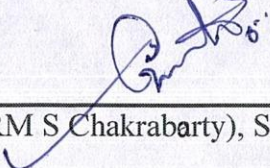

(R S Rana, JAD), DCPW



(Chandra Shekar Sharma), DC, CRPF



(Hitesh Dhull), DC, Tech Cell, BSF


(Purnendra Kumar Tiwari), DC, ITBP


(Capt. Rahul K), Team Cdr, NSG


(Inspr/RM S Chakrabarty), SIW, BSF


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Approved / Not Approved


**Director General
Border Security Force**