# GOVERNMENT OF INDIA (Ministry of Home Affairs) DIRECTORATE GENERAL

### CENTRAL RESERVE POLICE FORCE

EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066

(Email:- comncell@crpf.gov.in Tele/Fax:011-26107493)

No. B.V-7/2019-20-C (UAV)

Dated, the November'2019

To

- 1. DIG (Comn), ITBP
  Block No. 2, CGO Complex
  Lodhi Road, New Delhi-03
- 3. DIG (Comn), SSB East Block-V, R.K Puram

New- Delhi-66

5. DIG (Prov), BSF
Block No. 10, CGO Complex
Lodhi Road, New Delhi-03

- DIG (Comn), NSG
   Meharam Nagar
   Palam, New Delhi-37
- 4. AIG (Comn), CISF Block No. 13, CGO, Complex Lodhi Road, New Delhi-03
- 6. Liaison Office, Assam Rifle Room No-171, North Block, MHA New Delhi -01

#### Subject: Regarding QRs/TDs of Mini UAV.

Please find enclosed revised QRs and TDs of Mini UAV as Annexure-A & Annexure-B respectively duly approved by the competent authority is forwarded herewith for further necessary action.

Encl: (QRs & TDs of Mini UAV)

{P.R.Jha, DC (Comn)}

For DIG (Equipment)
Directorate General, CRPF

## **QRs FOR MINI UNMANNED AERIAL VEHICLE**

S.N.	Parameter	Specification				
1	UAS	a. Aerial Vehicle	02			
	(As a System)	b. Ground Control System	01			
		c. Remote Video Terminal	01			
	-	d. Day & Night Camera	02 each			
		or	02			
		Integrated both day and night camera				
		in one payload case.				
		(As per user requirement)				
		e. Data link Equipment/ Antenna	01 ·			
		f. Battery / Battery set for each Aerial Vehicle	04			
<u> </u> 	į	g. Water resistance (IP66) back packs to carry UAS	03			
		h. Rugged, compact and lightweight transportation box	03			
2	Aerial vehicle	a Air frame should be made of compo	site material			
	(AV)	rugged, durable and robust.				
		b The parts should be modular and ea	sy to replace			
		/maintain.				
		Fitment, removal and/or replacement of				
		sensors/payload should be simple	and easily			
	4.	executable in field conditions.				
		d Suitable battery charger using norma	l commercial			
	·	supply to charge the batteries.				
 		e The Aerial vehicle should have the	capability to			
		operate during day and night.				
3	Weight	a Maximum Takeoff Weight - As per DG	CA guidelines			
]		for Small category UAV				
		b The complete weight of UAS should				
! 		than 40 Kg and system should be pack backpacks.	cable in timee			
		Acrial Vehicle- 01				
Į		Ground Control System- 01				
		Remote Video Terminal- 01				
			Data link equipment/Antenna- 01			
<del>[</del>		Day and Night cameras- 01 each Battery /Battery set for aerial vehicle- 02				
	{	Waterproof (IP66) backpacks - 03				
ļ		Each back pack should not be more than 15 kgs				
		including the weight of back packs.	S			
4	Launch and	Vertical Takeoff and Landing (VTOL) withi	n the area of			
l	Recovery	25 X25 meter.				

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S.N	Parameter	Specification					
5	Deployment	Not more than 20 minutes.					
	time						
6	Aural	≤ 40 dB @ 300 meters AGL (Above Ground Level)					
	signature	· · · · · · · · · · · · · · · · · · ·					
7	Wind Speed	The AV should be able to Takeoff, Land and Fly upto the					
		wind speed of 20 knots.					
8	Propulsion	The AV should be powered by battery.  2. Hours with minimum loiter time of 60 minutes at full					
9	Operational	2 Hours with minimum loiter time of 60 minutes at					
1	Endurance	range with max payload up to launch altitude of 1000					
		meter above mean sea level.					
10	Mission	Minimum 15 Km					
ļ	Range						
11	Altitude	a.   Minimum Operational Altitude: 1000 meter AGL (Above					
		Ground Level)					
		b. Max Launch Altitude: 3000 meter AMSL (Above Mean					
		Sea Level)					
12	Temperature	Starting, Operating and Storage Temperature –					
		From Minus 5°C to Plus 55°C					
13	Flight Modes	The AV should be able to operate in following modes –					
		a Fully Autonomous Mode					
		b Semi Autonomous Mode					
		c Loiter Mode					
		d Target tracking Mode					
		e Return to home mode					
14	Payload	a The payload should have Gyro based stabilised cameras.					
		b Single payload assembly housing for day / night					
		camera.					
		or					
		Integrated both day and night camera in one payload					
	) ·	case.					
		(As per user requirement)					
]		c Payload should not damage during rough landings.					
		d Locking and auto tracking of the selected target in the					
		video imagery.					
		e 360° pan and 90° tilt control during flight for Day and					
		Night payloads independent of "YAW" movement of the					
i .	1	1 O - L-A					

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	S.N	Parameter				Specifi	cation		
t			f	UAV should	tra	ansmit real t	ime imagery to GCS		
				Day payload	_				
				i. 0 to 15 km-1280 x 720p or better					
	ţ			Night Payloa	<u>d</u> -				
				i. 0 to 15	5 k	km – 640 x 4	80 or better		
			g	Capabilities	of	payload			
				Parameter		Night	Day payload		
	į	r.				Payload			
				Resolution		640 X 480	1280 X 720 pixels or better		
				(Minimum)		pixels or			
		JP				better			
				Digital Zoom	l	4X or	4X or more		
						more			
				Optical Zoom			20X or more		
				NFOV			≤5°		
			!	WFOV			≥45° ·		
	15	Target	T	he system mi	ıst	be able to	detect, acquire and designate		
		Detection,	ta	argets up to	ma	aximum mis	sion range of 15 Km in the		
		Recognition,	fc	ollowing criter	ia:	-			
		Identification	P	ayload	V	ehicle size	Group of 3-4 People		
		(Minimum			(6	x3 meter)			
		Slant range)	D	ay payload					
			D	etection	2	000 m	1000 m		
			R	Recognition & 5		00 m	500 m		
		*	Ic	Identification		l			
			N	ight payload			<del></del>		
			D	etection &	1	250 m	500 m		
			R	ecognition					

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S.N	Parameter		Specification					
16	Ground	а	The GCS should be portable, MIL-STD-810G or					
	control		better.					
 	station		Rugged IP65 tablet/laptop, minimum display size 10"					
	(GCS)		or more					
			or					
			Semi-rugged IP52 tablet/laptop, minimum display					
			size 10" or more  (As per user requirement)					
		b	Battery backup upto 3 Hrs.					
	ļ	С	Suitable battery charger using normal commercial					
	·		supply.					
		d	It should be able to control all aspects like pre-flight					
		į ,	checks, self tests, control of takeoff/landing and					
			payloads.					
		е	Digital Mass storage: 1 TB for laptop or 512 GB for Tablet					
1		f	The laptop or tablet should have sunlight readable					
			and touch screen.					
		g	It should facilitate recording and playback of data.					
		h	In flight, change of flight plan or waypoint.					
	]	i	Suitable ports should be provided for taking the data.					
1		j	It should be capable of storing 100 or more flight					
	İ		routes with each route having capacity to configure					
	ļ		minimum 70 waypoints.					
		k	The software should have following mission					
	÷		information:-					
			i. Coordinates of target					
			ii. AV position iii. Distance of AV from GCS					
		}	iv. Air speed					
			v. Mission Time					
			vi. Payload looking angle					
			vii. Communication link status					
			viii. GPS status					
			ix. Health status of AV battery					

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S.N	Parameter		Specific	ation				
17	Мар	а	Should have the capability	to integrate geo-referenced				
	Formats		raster maps provided in at	least one of the commonly				
			used digital map formats (0	GIF, TIFF, DTED and SRTM				
			etc.)	· .				
		b	Ability to display 3D maps with the digital terrain data provided. Option to switch between 2D and 3D maps in real time.  It should be minimum 10 inches tablet, must be MIL-					
18	Remote	а	It should be minimum 10 inches tablet, must be MIL-					
	Video	ĺ.	STD-810G or more and IP65 or more, compact, light					
	Terminal (RVT)		weight and portable with wrist/chest mountable					
	(IX y 1)		holder. (As per user requirement)					
ļ		b	minimum distance of 3 Km	UAV should be able to transmit video to RVT at a minimum distance of 3 Km or more from UAV.				
		С	<del>-</del>	RVT to have capability to display video, map and OSD				
	ĺ		(On screen display) similar					
		d		Capable to record, playback and freeze the imagery				
	Í	<u> </u>	received from AV.					
		e	RVT should have sunlight readable and touch screen.					
19	Data link	а	Secure communication links between Air Vehicle and Ground Control Station with minimum 128 bits					
	ĺ		encryption.					
	!	b	<del>-</del>	and / or C-band frequency				
ļ			_	preferably on license free				
		<u></u>	band i.e. 2.4GHz or 5.8 GH					
20	Failsafe	a		n loss during flight, the				
	features		, -	ly change to recovery mode				
] 		1	· ·	time UAV should remain on				
:		<u> </u>	its flight path.					
<b>j</b> 		b	Automatic Return to Home,					
		C	Multiple GPS on-board for G					
		d	_	on board light to facilitate				
	1			ry, the operation of which				
01	N. 6' 11		should be GCS controlled.					
21	Miscellaneous	a	1 3					
		b	warranty of the UAS  Total technical life (TTL)	5 yrs or 750 landings				
		c	Life of AV battery	200 charging cycles or 2				
ĺ			bic of fiv battery	years, whichever is				
				earlier.				
L	L	<u> </u>		Carator.				

S.N	Parameter	Specification						
		d Product support after warranty up to 3 yrs						
		e Repair and maintenance including periodicity of midlife interventions/intent towards establishing maintenance hubs etc.						

INSP/T. B.C. Roy Chaudhary BSF

Karan Singh, AC(T)

P.S. Meena, AC SSB

R.K. Meel, DC

**CISF** 

P.R.Jha, DC(Comn) CRPF

Maj. Surender Singh NSG

Lt.Col, Umesh Chandra Sati Assam Rifles Harjinder Singh, DIG(Eqpt)

CRPF

Virendra Agrawal, DIG(Comn)

CRPF

Ajay Kumar Yadav, IPS

IGP(Comn &IT), CRPF

Md. Jawes Thear, IPS SDG, CRPF

Approved/Not Approved

Rajeev Rai Bhatnagar, IPS

DG, CRPF

#### Trial Directives of Mini UAV

Trial/Technical evaluation of UAV will be conducted by a Board of Officers (B.O.O.) to assess actual performance of the equipment.

- 2. All parameters/Specifications mentioned in QRs will be checked by the Board of Officers in the presence of representative of firm.
- i) **Physically check:** In this category, specifications of the equipment will be checked physically as per QRs.
- ii) **Practically check:** The representative of firm will show all the features/configuration of the equipment to the board of officers during trial.
- iii) **Submission of certificates:** Firm will provide certificate from Govt. Lab. or DRDO or NABL accredited or ILAC accredited laboratory which are mentioned in respective parameters.

S.N	Parameter		Specification		Trial directives
1	UAS (As a	a.	Aerial Vehicle	02	Board will check
	System)				physically.
		b.	Ground Control System	01	Board will check
					physically.
		c.	Remote Video Terminal	01	Board will check
		<u></u>			physically.
		d.	Day & Night Camera	02	Board will check
		-		each	
			or	02	Board will check
			Integrated both day and		physically.
			night camera in one		
			payload case.		
			(As per user		
	e.		requirement)	0.1	<u> </u>
			Data link Equipment/	01	Board will check
,			Antenna		physically.
-		f.	Battery / Battery set	04	Board will check
			for each Aerial Vehicle		physically.
					For single battery : 04 batteries
					or
					For battery set:
					04 sets
		g.	Water resistance (IP66)	03	Firm will produce
		δ.	back packs to carry		certificate of Govt. Lab.
	h.		UAS		or NABL/ILAC accredited
					laboratory.
! i			Rugged, compact and	03	Board will check
			lightweight		physically.
			transportation box		F- JJ
2	Aerial	a	Air frame should be made	le of	Board will check
	vehicle (AV)		composite material rug		physically and firm will
			durable, and robust.	produce OEM certificate.	
		b	The parts should be mod	lular	-
			<del>-</del>	lace	
			/maintain.		

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S.N	Parameter	Specification	Trial directives						
		<ul> <li>c. Fitment, removal and/or replacement of sensors/payload should be simple and easily executable in field conditions.</li> <li>d. Suitable battery charger using normal commercial supply to charge the batteries.</li> <li>e. The Aerial vehicle should have the capability to operate during day and night.</li> </ul>	and firm will produce OEM certificate.						
3	Weight	a. Maximum Takeoff Weight - As per DGCA guidelines for Small category UAV  b. The complete weight of UAS should not be more than 40 Kg and system should be packable in three back packs. Aerial Vehicle- 01 Ground Control System- 01 Remote Video Terminal- 01 Data link equipment/Antenna- 01 Day and Night cameras- 01 each Battery /Battery set for aerial vehicle- 02 Waterproof (IP66) backpacks - 03  c. Each back pack should not be more than 15 kgs including	practically.						
4	Launch and	the weight of back packs.  Vertical Takeoff and Landing	Board will check						
	Recovery	(VTOL) within the area of 25 X25 meter.							
5	Deployment time	Not more than 20 minutes.	Board will check practically.						
6	Aural	≤ 40 dB @ 300 meters AGL (Above	Firm will produce						
	signature	Ground Level)	certificate of Govt. Lab. or DRDO or NABL/ ILAC accredited laboratory.						
7	Wind Speed	The AV should be able to Takeoff, Land and Fly up to the wind speed of 20 knots.	Firm will produce OEM certificate.						
8	Propulsion	The AV should be powered by battery.	Board will check practically.						

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C N	-3- I Parameter Specification Trial directives							
S.N	Parameter	Specification						
9	Operational	2 Hours with minimum loiter	Board will check					
	Endurance	time of 60 minutes at full range	practically and Firm will					
		with max payload up to launch	produce OEM certificate.					
		altitude of 1000 meter above						
		mean sea level.	Acceptable for					
			degradation in					
			endurance 10% per					
			1000 meter beyond 1000					
			meter above mean sea					
10			level.					
10	Mission	Minimum 15 Km	Board will check					
	Range		practically.					
11	Altitude	a. Minimum Operational	Board will check					
		Altitude: 1000 meter AGL	practically.					
		(Above Ground Level)						
	·	b. Max Launch Altitude: 3000	Firm will produce OEM					
		meter AMSL (Above Mean	certificate.					
	·	Sea Level)						
12	Temperatur	Starting, Operating and Storage	Firm will produce					
	е	Temperature –	certificate of Govt. Lab.					
		From Minus 5°C to Plus 55°C	or NABL/ILAC					
			accredited laboratory.					
13	Flight	The AV should be able to operate	Board will check					
	Modes	in following modes -	practically.					
	·	a Fully Autonomous Mode						
		b Semi Autonomous Mode						
:		c Loiter Mode						
		d Target tracking Mode						
14	D11	e Return to home mode	71					
14	Payload	a The payload should have	_					
		Gyro based stabilised	certificate.					
	.	cameras.	The state of the s					
		b Single payload assembly						
		housing for day / night	physically.					
		camera.	ŀ					
. [		or						
	·	Integrated both day and						
		night camera in one payload						
- 1		case. (As per user						
		requirement)						

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S.N	Parameter	Sp	ecification	<u> </u>	Trial directives
		c Payload	should no	ot damage	Board will check practically.
				cking of the the video	I
		e 360° pan during flig payloads	and 90° tht for Day independent of the UAV	1	
		f UAV shou imagery to Day payloa	ld transmi GCS ad- 15 km-12	Board will check practically real time imagery and firm will produce OEM certificate.	
		bette	15 km – 64 er	40 x 480 or	
		g Capabilitie	s of payloa	d	
		Parameter	Night Payload	Day payload	Firm will produce OEM certificate for day &
		Resolution (Minimum)	640X 480 pixels or better	1280X72 0 pixels or better	night payload resolution.
		Digital Zoom Optical Zoom	4X or more	more 20X or more	
		NFOV WFOV		≤5° ≥45°	
15	Target Detection, Recognition, Identification	The system m acquire and d maximum mis in the followin	esignate ta sion range g criteria:-	e to detect, argets upto e of 15 Km	Board will check practically. Detection- Ability to distinguish an object
	(Minimum Slant range)	siz (6:	æ 4	Group of 3- People	from the background.  Recognition- Ability to classify the object class
		-	·		(Animal, Human, Vehicle, Boat etc) Identification- Ability to describe the object in details (man with
					weapon, hat, Uniform / Colour of Cloths, type / colour of vehicle)

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	 -F-	cification		Trial directives
	Day payload	,		During Recognition and
	Detection	2000 m	1000 m	Identification, UAV
	Recognition &	500 m	500 m	should be able to
1 .	Identification	l	}	descend up to the
				height of 500 mtr AGL.
}			1	However due to
				geographical or physical
		-	Ì	constraints like thick
				foliage, undulating terrain or LOS
				constraints, the UAV
				should be able to do
		ļ		recognition and
				Identification from 800
.] ]	•		1	mtrs AGL at full range.
	Night payload		· · · · · · · · · · · · · · · · · · ·	
!	Detection	1250 m	500 m	Board will check
	86			practically.
]	Recognition	}		Detection- Ability to
		1		distinguish an object.
		}		Recognition- Ability to
	·		i i	classify the object class
			1	(Animal, Human,
,				Vehicle, Boat etc)
1				During Recognition,
				UAV should be able to
			•	descend upto the height
, ,	ļ	]		of 500mtrs AGL.
				However due to
				geographical or physical
				constraints like thick
	}		1	foliage, undulating
	1			terrain or LOS constraints, the UAV
				should be able to do
.				recognition from 800
				mtrs AGL

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S.N	Parameter	Spe	cification	Trial d	lirectives	
16	Ground		ıld be portable, MIL-	Firm w	ill produce	
	control	STD-810G or b	etter.	certificate	of Govt. Lab.	
	station	a Rugged	IP65 tablet/laptop,	or NABL/ILAC		
1	(GCS)		display size 10" or		laboratory	
		more	·		FD-810G and will check	
					ze practically.	
		or		aropray or	or production.	
		Semi-rugg	ed IP52			
		tablet/lap				
		_	e 10" or more			
			ļ			
	·	(As per use	er requirement)			
		b Battery ba	ckup upto 3 Hrs.	Board	will check	
				practically	7.	
		c Suitable b	oattery charger using	Firm will p	produce OEM	
1		normal co	mmercial supply.	certificate.	•	
	ļ	d It should	be able to control all	Board	will check	
		aspects li	ke pre-flight checks,	practically	7.	
		self te	sts, control of			
		takeoff/lar	nding and payloads.			
		e Digital Ma	ass storage: 1 TB for	Board	will check	
		laptop or 5	512 GB for Tablet	practically	7.	
	i	f The lapto	p or tablet should	Board	will check	
	·	have sur	llight readable and	practically	7.	
		touch scre	en.			
		g   It should	facilitate recording	Board	will check	
			ack of data.	practically	<i>7</i>	
		h ∣In flight, (	change of flight plan		will check	
	:	or waypoir	nt.	practically Board	7	
	1	i Suitable	provided for taking the data.		will check	
}	1	<del></del>			7	
		<b>'</b> 1	It should be capable of storing		will check	
		l l	ore flight routes with	practically	<i>7</i> .	
		ł	e having capacity to			
		configure	minimum 70			
L	<u> </u>	waypoints	•		=	
	•		<del></del>	1		

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S.N	Parameter	Specification	Trial directives					
	,	k The software should have following mission information:  i. Coordinates of target  ii. AV position  iii. Distance of AV from GCS  iv. Air speed  v. Mission Time  vi. Payload looking angle	Board will check practically.					
		vii. Communication link status viii. GPS status ix. Health status of AV battery						
17	Map Formats	a Should have the capability to integrate geo-referenced raster maps provided in at least one of the commonly used digital map formats (GIF, TIFF, DTED and SRTM etc.)	Board will check practically and firm will also submit OEM certificate.					
		b Ability to display 3D maps with the digital terrain data provided. Option to switch between 2D and 3D maps in real time.						
18	Remote Video Terminal (RVT)	a It should be minimum 10 inches tablet, must be MIL-STD-810G or more and IP65 or more, compact, light weight and portable with wrist/chest mountable holder. (As per user requirement)	Board will check practically and firm will produce certificate of Govt. Lab. or NABL/ILAC accredited laboratory for MIL-STD-810G or more and IP65 or more.					
		<ul> <li>b UAV should be able to transmit video to RVT at a minimum distance of 3 Km or more from UAV.</li> <li>c RVT to have capability to display video, map and OSD (On screen display) similar to GCS.</li> </ul>	Board will check practically.  Board will check practically.					
		d Capable to record, playback and freeze the imagery received from AV.	Board will check practically.					

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S.	Parameter	Specification			Trial directives	
N	·					
		e	RVT should have	sunlight readable	Board will check	
			and touch screen.		practically.	
19	Data link	а	Secure communication	ation links between	Firm will produce	
			Air Vehicle and	Ground Control	OEM certificate for	
!	}		Station with mi	nimum 128 bits	AES encryption for	
-	encryption.				both telemetry &	
!	·				video.	
		b	Should operate or	n S-band and / or	Firm will produce	
	C-band frequency for uplin				OEM certificate.	
			-	bly on license free		
			band i.e. 2.4GHz o	·		
20	features flight, the system should					
					practically.	
	!		automatically ch			
			mode after 10 seco			
	. !		UAV should remain			
		b	Automatic Return	Board will check		
1	!	!	low battery.	practically.		
		С	Multiple GPS of	l -		
			failure.	OEM certificate.		
		d	There should be facility for on board light to facilitate visual signature for recovery, the operation of which should be GCS controlled			
		'			practically.	
		}				
0.1	Missellansons				Firm will produce	
21	Miscellaneous	a	f	2 yrs	Firm will produce OEM certificate.	
		ļ	comprehensive warranty of the		OEM ceruncate.	
		·	UAS			
		b	<del></del>	5 yrs or 750	Firm will produce	
			1	landings	OEM certificate.	
		С		200 charging		
		ັ		cycles or 2 years,	<u> </u>	
		} ,	whichever i			
	i	1	1		I	

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S.N	Parameter		Specification		Trial directives	
		d	Product support after warranty	up to 3 yrs	Firm will certificate.	produce OEM
		е	Repair and maintena periodicity of interventions/intent establishing maintent etc.	midlife towards	Firm w undertakin	•

INSP/T. B.C. Roy Chaudhary BSF Karan Singh, AC(T)

P.S. Meena, AC SSB

R.K. Meel, DC CISF

P.R.Jha, DC(Comn) CRPF Maj. Surender Singh NSG

Lt.Col, Umesh Chandra Sati Assam Rifles Harjinder Singh, DIG(Eqpt)

CRPF

Virendra Agrawal, DIG(Comn)

CRPF

Ajay Kumar Yadav, IPS

IGP(Comn &IT),CRPF

Md. Jawed Aldriar, IPS SDG, CRPF

Approved/Not Approved

Rajeev Rai Bhatnagar, IPS

DG, CRPF