

**TECHNICAL SPECIFICATION OF CATAGORY-2: INTEGRATED COUNTER UNMANNED AERIAL VEHICLE
(C-UAV) SYSTEM (SOFT KILL) - FOR UN MSN (DP-5)**

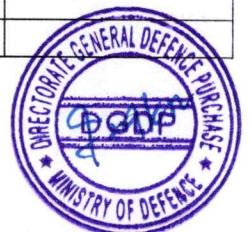
Ser	Facts	Specification	To be filled by Principal/ Manufacturer
Part-1: General Specification			
1.	Name of the System/Equipment	Integrated Counter Unmanned Aerial Vehicle (C-UAV) System (Soft Kill)	
2.	Make & Model	To be mentioned (in case different make and model, should be mentioned separately for each item)	
3.	Country of Origin	Group B	
4.	Country of Manufacturer/ Assembly	Group B	
5.	Name and complete address of Manufacturer (Address, Telephone, E-mail & Website)	To be mentioned (in case of different manufacturer, should be mentioned separately for each item)	
6.	Name and completed address of Principal (Address, Telephone, E-mail & Website)	To be mentioned (in case of different principal, should be mentioned separately for each item)	
7.	Name and completed address of Local Agent (Address, Telephone, E-mail & Website)	To be mentioned (in case of different local agent, should be mentioned separately for each item)	
8.	Port of Shipment	From country of origin/ manufacturer	
9.	Year of Production	Not earlier than the calendar year of contract	
10.	Capability of the Integrated Counter Unmanned Aerial Vehicle System (Only Soft Kill)	All kinds of Integrated Counter Unmanned Aerial Vehicle System (Only Soft Kill) should have capability to: a. Detect, locate and neutralize drone/C-UAV. b. Engage multiple targets attacking from several directions. c. To identify the targets and operate in intense Electronic Warfare environment. d. Able to operate in extreme weather conditions eg. Heat, rain, fog, dust etc. e. Able to deter swarm drone attack f. Ability to deploy and be operational within 30 minutes time.	
11.	List of Equipment / System Configuration	Integrated Counter Unmanned Aerial Vehicle System (Only Soft Kill) with combination of the following Sub-systems: a. RF Detector, Protocol Analysis and Direction Finding System. b. EO-IR Camera with LRF. c. 3D Surveillance Radar. d. Acoustic sensor (Optional, availability to be mentioned). e. Omni-Directional with Directional Jammer. f. Spoofer. g. Command and Control System including software along with perpetual license. h. Power supply system with Generator. j. Any other system.	



Ser	Facts	Specification	To be filled by Principal/ Manufacturer
Part-2: Technical Specification			
12.	<u>RF Detector, Protocol Analysis and Direction Finding System</u>		
	a. General		
	(1) Nomenclature	To be mentioned	
	(2) Brand and Model	To be mentioned	
	b. Technical Capabilities		
	(1) Frequency Range (MHz/GHz)	From 400 MHz to 6000 MHz and above (All available frequency to be mentioned)	
	(2) RF Detection Range	Minimum radius 5 km (Without Blind Zone)	
	(3) Frequency compatibility	To be mentioned	
	(4) Control Interface	To be mentioned	
	(5) Antenna Type	Both Directional and omni-directional antenna	
	(6) Track While Scan (TWS) capability	To be mentioned (optional)	
	(7) Operation Periods (a) Operation hour (b) Cool down period required after a certain period of continuous operation	a. Operation hour: 24 x 7 b. Cool down period: To be mentioned	
	(8) Alarm indication and automatic notification	Automatic audio-visual alert system	
	(9) Remote control Interface	To be mentioned	
	(10) RF Protocol Database/ Library Drone count	a. To be Available. b. Shall have ability to determine the ground location of the remote-control operator for drones which are within known communication protocol library. c. The system must have database of all known signature of commercial drones. d. Shall be able to identify make and model of commercial drone.	
	(11) RF Protocol Database update interval	To be provided within warranty period (Free of cost)	
	(12) RF Protocol Database online update facility	To be mentioned	
	(13) RF Protocol Database export and import facility, data format	To be mentioned	
	(14) Direction-finding method	To be mentioned	
	(15) Direction-finding Accuracy	ITU Class A (probability of less than 5% that error exceeds 1°)	
	(16) Detection and direction finding additional station / antenna requirement	To be mentioned	
	(17) Power Supply (a) Main power supply source. (b) Alternative power supply source.	To be Available. 1+1 (Active and Standby) 100%Duty cycle (Details to be mentioned)	
	(18) Weight	To be mentioned	
	(19) Operating Temperature	-5°C to + 55°C (Specific data to be mentioned)	
	(20) Ingress Protection	Minimum IP65 (Specific data to be mentioned)	
	(21) Weather	Able to operate in extreme weather conditions eg. Heat, rain, fog, dust	
	(22) No of Drones can be detected	a. Minimum 30 or more. (Specific no to be mentioned) b. Must have the ability to detect and locate multiple drones (including drone swarm) operating in different frequencies at the same time.	



Ser	Facts	Specification	To be filled by Principal/Manufacturer
	(23) C2 System Integration	The system shall be able to integrate with C2 System	
	(24) Monitoring and Recording	To be Available	
	(25) Integrated GNSS Receiver	To be mentioned	
	(26) Tracking accuracy	Below 5 degree (Specific data to be mentioned)	
	(27) Detection time	Max 10 Sec for any drones (Specific time to be mentioned)	
	(28) RF Detector Coverage	360 degree dome coverage for detection with direction and altitude	
	(29) RF Distortion	Ability minimize in urban areas, mountainous regions and deep forests	
	(30) Automatic Report Generation	To be available	
13.	Optical Detection System		
	a. EO and IR Camera Technical Capabilities		
	(1) Nomenclature	To be mentioned	
	(2) Name of manufacturer	To be mentioned	
	(3) Brand	To be mentioned	
	(4) Model and type	To be mentioned	
	(5) Main functions	To be mentioned	
	(6) Spectral sensitivity waveband	To be mentioned	
	(7) Detector	To be mentioned	
	(8) Color	To be mentioned	
	(9) Generation	Minimum generation III or better	
	(10) Resolution (a) Electro Optical (b) Infrared	(a) Minimum 1920x 1080 pixels (FHD color) (b) 640x512 pixels HD	
	(11) Figure of Merit (FoM)	To be mentioned	
	(12) Signal to Noise ratio (SNR)	To be mentioned	
	(13) Video output (TV Standard)	To be mentioned	
	(14) Video signal	To be mentioned	
	(15) Fields of view (a) Narrow FoV (b) Medium FoV (c) Wide FoV	To be mentioned To be mentioned To be mentioned	
	(16) NETD (NFOV, blackbody 20°C)	Lower than 50 mK or less (Specific data to be mentioned)	
	(17) Focussing distance ranges (NFOV)	To be mentioned	
	(18) Switch on time	Maximum 90 Sec (Specific time to be mentioned)	
	(19) Detection Range	Minimum 3 km	
	(20) Identification range	2 km minimum	
	(21) Classification range	1.5 km minimum	
	(22) Detector Type	To be mentioned	
	(23) Pixel Size	To be mentioned	
	(24) Spectral Band	To be mentioned	
	(25) Image Processing	AGC, MIDE, Sharpness, Smooth	
	(26) Focus	Auto, Manual	
	(27) Integration with C2 System	To be available	



Ser	Facts	Specification	To be filled by Principal/Manufacturer
	b. <u>Laser Range Finder (LRF).</u>		
	(1) Make and model	To be mentioned	
	(2) Main functions	To be mentioned	
	(3) Laser transmitter type	To be mentioned	
	(4) Wavelength	To be mentioned	
	(5) Beam divergence	To be mentioned	
	(6) Instrumented range	To be mentioned	
	(7) Range measuring resolution interface (LSB)	To be mentioned	
	(8) Laser safety classification	To be mentioned	
	(9) Nominal Ocular Hazard Distance (NOHD)	To be mentioned	
	(10) Laser safety classification	To be mentioned	
	(11) Range measuring accuracy	To be mentioned	
	c. <u>PTZ Features</u>		
	(1) Motor	To be mentioned	
	(2) Angle	PAN:360° continuous, Tilt: ±90°	
	(3) Speed (PAN and Tilt)	Configurable (To be mentioned)	
	(4) Accuracy	To be mentioned	
	(5) Power	AC220V	
	(6) Daylight camera (Zoom)	Minimum 8x- optical zoom	
	(7) Resolution of thermal camera	Minimum 640x512 Pixels HD	
	(8) Thermal camera (Zoom)	Minimum 6x	
	d. <u>Others</u>		
	(1) Interface	TCP/IP, Ethernet (IP4/IP6 optional)	
	(2) Operating Temperature	-5°C to + 55°C (Specific data to be mentioned)	
	(3) Ingress Protection	Minimum IP 65 (Specific data to be mentioned)	
	(4) Weight and Dimension	To be mentioned	
	e. <u>Object Tracking Performance (Common for EO & IR)</u>		
	(1) Tracking Type	To be mentioned	
	(2) Tracking Method	To be mentioned	
	(3) No. of Simultaneous Targets	To be mentioned	
	(4) Target Types Supported	To be mentioned	
	(5) Minimum Track able Target Size	To be mentioned	
	(6) Min. Tracking Range (EO/IR)	To be mentioned	
	(7) Max. Tracking Range (EO/IR)	To be mentioned	
	(8) Tracking Accuracy (Angular Error)	To be mentioned	
	(9) Tracking Stability	To be mentioned	
	(10) Track Loss Recovery Time	To be mentioned	
	(11) Automatic Target Classification	To be mentioned	
	(12) Track History Recording/Replay	To be mentioned	



Ser	Facts	Specification	To be filled by Principal/Manufacturer
14.	<u>3D Surveillance Radar</u>		
	a. <u>General</u>		
	(1) Nomenclature	Phased Array Pulse Doppler 3D Radar (Specific data to be mentioned)	
	(2) Brand and Model	To be mentioned	
	(3) Name and address of the manufacturer	To be mentioned	
	(4) Year of manufacture	To be mentioned	
	b. <u>Technical Capabilities</u>		
	(1) Detection Capability	All type of drone including Military drone of any size, weight and velocity (Specific data to be mentioned)	
	(2) Target Types & Ranges for Targets	To be mentioned	
	(3) Coverage	To be mentioned	
	(4) Frequency	Specific frequency to be mentioned	
	(5) Frequency Covered Band	X Band	
	(6) Minimum RCS Requirement for static and moving target	To be mentioned	
	(7) Clutter Avoidance	To be mentioned	
	(8) AI Assistance	To be mentioned	
	(9) Threat Assessment and Alarm Function	To be mentioned	
	(10) Simultaneous Tracking Target Count	Minimum 30 or more	
	(11) Target Handling	To be mentioned	
	(12) Detection Accuracy	Minimum 90%	
	(13) ECCM Features	To be mentioned	
	(14) IFF Integration	To be mentioned	
	(15) Antenna Type & Scan Rate	To be mentioned	
	(16) Antenna Mounting & Height	To be mentioned	
	(17) Horizontal Scan Direction Coverage	To be mentioned	
	(18) Vertical Scan Direction Coverage	To be mentioned	
	(19) Antenna Technology	To be mentioned	
	(20) Activation Time	To be mentioned	
	(21) Display & Control	To be mentioned	
	(22) Built-In Test Equipment	To be mentioned	
	(23) Operational Life	To be mentioned	
	(24) Modular Parts Replacement Facility	To be mentioned	
	(25) Primary Source	To be mentioned	
	(26) Commercial Power	To be mentioned	
	(27) Operating Temp	To be mentioned	
	(28) Humidity	To be mentioned	
	(29) Ingress Protection	To be mentioned	
	(30) Mobility	To be mentioned	
	(31) Colour	To be mentioned	
	(32) Lightning Protection	To be mentioned	
	(33) Air Conditioning	To be mentioned	
	(34) Cooling System	To be mentioned	
	(35) Operation Time	24/7	
	(36) Beam Width	To be mentioned	



Ser	Facts	Specification	To be filled by Principal/Manufacturer
	(37) Beam Height	To be mentioned	
	(38) Azimuth Resolution	To be mentioned	
	(39) Range Resolution	To be mentioned	
	(40) Detection Range of Radar	Minimum 10 km	
	(41) Classification Range	To be mentioned	
	(42) Radar Accuracy (a) Height Accuracy (b) Range Accuracy (c) Azimuth Accuracy	To be mentioned (Specific data to be mentioned)	
	(43) Average Power Output	To be mentioned	
15.	<u>Acoustic sensor (Optional Item)</u>		
	a. <u>General</u>		
	(1) Nomenclature	To be mentioned	
	(2) Brand and Model	To be mentioned	
	b. <u>Technical Capabilities</u>	To be mentioned	
	(1) Sensor Type	To be mentioned	
	(2) Detection Method	To be mentioned	
	(3) Target Types	To be mentioned	
	(4) Coverage	To be mentioned	
	(5) Detection Range (Mini/Micro Drones)	Minimum 500m or more	
	(6) Detection Range (FPV/Large Drones)	Minimum 1 km or more	
	(7) Direction of Arrival (DOA) Accuracy	To be mentioned	
	(8) Detection Latency	To be mentioned	
	(9) Minimum Target SNR	To be mentioned	
	(10) Number of Microphones	To be mentioned	
	(11) Microphone Type	To be mentioned	
	(12) Frequency Range	To be mentioned	
	(13) Sensitivity	To be mentioned	
	(14) Self-Noise Floor	To be mentioned	
	(15) AI-based Classification	To be mentioned	
	(16) Target Library	To be mentioned	
	(17) Classification Accuracy	To be mentioned	
	(18) Ingress Protection	To be mentioned	
	(19) Operating Temperature	To be mentioned	
	(20) Weight	To be mentioned	
	(21) Dimensions	To be mentioned	
	(22) Mounting	To be mentioned	
16.	<u>Jammer System</u>		
	a. <u>General</u>		
	(1) Nomenclature	To be mentioned	
	(2) Brand and Model	To be mentioned	
	(3) Jammer Type	Portable/Static(Specific state to be mentioned)	
	b. <u>Technical Capabilities</u>		
	(1) Jamming Distance	Directional Jamming: Minimum 05 Km Omni Directional Jamming: Minimum 05 km	
	(2) Antenna Gain	High Gain Omni / Directional Antenna	



Ser	Facts	Specification	To be filled by Principal/Manufacturer
	(3) Antenna Beam Width	To be mentioned	
	(4) Antenna VSWR	To be mentioned	
	(5) Operating Temperature	To be mentioned	
	(6) Ingress Protection	Minimum IP65 (Specific data to be mentioned)	
	c. <u>RF and GNSS Jammer</u>		
	(1) Effective range for directional jamming	Minimum 05 km	
	(2) Type of Directional Jamming Antenna	To be mentioned	
	(3) Directional Antenna Gain	To be mentioned	
	(4) Effective range for Omni Directional jamming	Minimum 05 km radius	
	(5) Type of Omni Directional Jamming Antenna	To be mentioned	
	(6) Omni-Directional Antenna Gain	To be mentioned	
	(7) Auto target pointing from the C2 center	To be mentioned	
	(8) Jamming frequency range	From 400 MHz to 6000 MHz and above (All available frequency to be mentioned)	
	(9) Jammer Mode of Operation	To be mentioned	
	(10) Ability to defeat drone swarm attack	To be mentioned (Minimum no of drones can be neutralized at a time to be mentioned)	
	(11) Jamming outcome	To be mentioned	
	(12) Individual Module Jamming Power Output	To be mentioned	
	(13) Total Jamming Power Output	To be mentioned	
	(14) Scalable	To be mentioned	
	(15) Shall allow the user to configure each channel independently	To be mentioned	
	(16) System shall be programmable to exclude any required frequencies used for local communication	To be mentioned	
	(17) Operation time	24/7	
	(18) Power input	220V / 50 Hz	
17.	<u>Spoofing System</u>		
	a. Spoofing range	Minimum 3 km	
	b. Frequency coverage	To be mentioned	
	c. Size and weight	To be mentioned	
	d. Power output	To be mentioned	
	e. No Fly Zone declaration	To be mentioned	
	f. No of directions can be controlled	To be mentioned	
18.	<u>Command and Control / C2 System</u>		
	a. Operating system	To be mentioned	
	b. Maps	To be mentioned	
	c. Software interface	To be mentioned	
	d. Server requirements	To be mentioned	
	e. Client requirements	To be mentioned	
	f. Format of Data Transfer	To be mentioned	
	g. Network Integration	To be mentioned	
19.	<u>Power Supply System/ Generator</u>		
	a. Brand and Model	To be mentioned	
	b. Model	To be mentioned	
	c. Country of Origin, Manufacturer and Assembly	Group B Countries	
	d. Compatibility	(1) Output power to be compatible with the supplied C-UAV System	



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Ser	Facts	Specification	To be filled by Principal/ Manufacturer
		(2) The output power of Generator (prime power) should 20% higher than the maximum total power consumption of C-UAV system	
	e. Output Power		
	(1) Prime Power	To be mentioned	
	(2) Standby Power	To be mentioned	
	f. Working Condition		
	(1) Continuous operation time	Minimum 12 Hrs.	
	(2) Canopy	Canopied.	
	(3) Noise	Maximum sound level is 70 dB at 7 meters distance.	
	(4) Safety Features	Overload protection, High Temperature, low/ high oil pressure protection with auto shutdown facility to be available.	
	(5) Mounting	Portable mounting to be provided	
	g. Engine		
	(1) Brand/ Make and Model	To be mentioned	
	(2) Country of Origin, Manufacturer and Assembly	Group B Countries	
	(3) Type of Engine	Diesel	
	(4) Number of Cylinders	To be mentioned	
	(5) Output power (KW)	(1) Prime: To be mentioned. (2) Standby: To be mentioned.	
	(6) RPM of Engine	To be mentioned	
	(7) Cooling System	To be mentioned	
	(8) Battery for Self-Starter	Volt and Ah to be mentioned.	
	(9) Fuel Consumption Liters/hour at full load (100%)	To be mentioned	
	(10) Fuel Tank Capacity	To be mentioned	
	h. Alternator (Generator)		
	(1) Brand/ Make and Model	To be mentioned	
	(2) Country of Origin, Manufacturer and Assembly	Group B Countries	
	(3) Number of phases	Single/ Three Phase. To be mentioned	
	(4) Rated output voltage	To be mentioned (220-240 V AC preferable)	
	(5) Frequency	To be mentioned (50 Hz preferable)	
	(6) Power Factor (Cos Φ)	Not less than 0.8	
	(7) AVR	To be mentioned	
	(8) Ventilation	To be mentioned	
	j. Control Panel		
	(1) LCD/ LED Display	Displaying Volt, Ampere, Frequency, Fuel in Tank, Oil pressure, Running Hour, Temperature, KVA, KW, RPM, Power factor (pf) etc.	
	(2) Switches	Start & Stop key/ push button with auto starting provision	
20.	Logistics		
	a. Transportation	To be mentioned (e.g., Vehicle Mountable, Portable)	
	b. Storage Requirements	To be mentioned (e.g., Dimensions, Environment)	
	c. Accessories	To be mentioned (List all standard accessories)	
	d. Storage Facilities	Must include temperature-controlled facilities	
21.	Model Validity	To be mentioned	
22.	Warranty/Guaranty	Minimum 12 Months	
23.	After Sales Service	Minimum 5 years (IPL to be provided for spares of 3-5 years)	
24.	Software Support	After warranty period to be mentioned	



Ser	Facts	Specification	To be filled by Principal/Manufacturer
Part-3 : Training Requirement			
25.	a. Operations and maintenance training	To be provided (As per requirement of AD Dte)	
	b. Care, maintenance and preservation training	To be provided (As per requirement of Ord Dte)	
	c. Maintenance and repair training	To be provided (As per requirement of EME Dte)	
Part-4 : Repair and Maintenance Requirement less list of spares			
26.	a. Provision for SST, Special Testing Equipment, Performance Test, fault finding and rectification gauges	To be provided as per requirement of EME Directorate	
	b. List of Special Service Materials (SSM)	To be provided as per requirement of EME Directorate	
	c. Publication		
	(1) Owners/Operations Manual in English including soft copy	To be provided as per requirement of EME Directorate	
	(2) Workshop/Repair Manual in English including soft copy	To be provided as per requirement of EME Directorate	
	(3) 100% updated master spare parts catalogue in English including soft copy	To be provided as per requirement of EME Directorate	
	(4) Complete and updated master spare parts price catalogue/ List in English including soft copy	To be provided as per requirement of EME Directorate	
Part-5 : List of Spares			
27.	a. Operational/ first line spares, tools, accessories and kits (SPTA)	To be provided as per requirement of EME Directorate	
	b. Fast and slow moving spare parts	To be provided as per requirement of EME Directorate	
Part-6 : Tools List for Different Level of Maintenance			
28.	Tools box	All essential and integral tools and accessories to be available and fitted and supplied in the tools box (To be confirmed with submitted list).	
Part-7 : Financial Specification			
29.	Financial aspects (Financial Terms and Conditions)	To be mentioned	

