## QUESTIONNAIRE FOR DESIGN & DEVELOPMENT OF AUTONOMOUS SURVEILLANCE AND ARMED DRONE SWARM (DESERTS/ PLAINS) AS MAKE II PROJECT

1.  **Company Details**.

    (a)   The category of the company, whether large/medium/small or Start Up.

    (b)   Years of existence (Established in _____).

    (c)   Annual turnover of the company.

    (d)   The credit rating of the company and net worth.

    (e)   Annual profit in the last three financial years.

    (f)   The shareholding pattern of the company.

    (g)   Whether the company is OEM, manufacturing agency or system integrator.

    (h)   Experience of the company in related fields.

    (j)   Whether similar equipment has been supplied to any other government agency (Type of equipment, quantity and cost).

    (k)   Whether company has patents/IPR of any critical components/ sub-systems.

    (l)   Whether the company has any tie-ups/ Joint ventures with any foreign firm for producing similar equipment.

2.  **Infrastructure**.

    (a)   Does the company have adequate infrastructure to develop, integrate and manufacture? If not, what would be the procedure and timelines to establish the same?

    (b)   Does the company have adequate infrastructure for carrying out trials and testing of equipment?

3.  **R&D**.  Infrastructure and number of employees working in R&D of systems related to the product.

4.  **Cost**.

    (a)   Cost of the prototype and the product (unit cost and total cost).

    (b)   Likely life cycle cost of the system.

    (c)   Minimum quantity economically viable for business.

5.   **Indigenous Content**.

(a)   Likely achievable indigenous content at prototype as well as production stage.

(b)   Critical technologies identified which are not likely to be available in India, to be sourced ex-import (in cost percentage terms).

(c)   Sub-systems/equipment manufactured by the company and details of outsourced equipment along with details of the manufacturer.

6.   **Time for Manufacture**.   Likely time for development of the prototype (in weeks) and manufacturing of the product (per year capability).

7.   **Sustenance**.

(a)   The ability of the company to sustain the product through the lifecycle of the equipment (including spares and upgrades).

(b)   How will you ensure continuous supply of spares especially for components procured ex-import?

(c)   How will continuous supply of spares be ensured from sub-contractors?

(d)   Recommended requirement of SMTs/STEs, jigs and fixtures.

(e)   Warranty period of the product.

8.   **Training**.

(a)   Details of initial and refresher training required.

(b)   Details of training/operating manuals to be provided.

9.   **Quality Certification**.

(a)   Details regarding quality certification like ISO 9000 etc, if so, details of date of certification with validity and certification agency.

(b)   Measures and capability to meet environmental specification as per laid down norms.

10.   **Broad Details/Technical Specifications of Existing Products/ Under Development or Capable of Being Manufactured**.

(a)   Details of swarm, GCS, Payloads and other components.

(b)   Configuration of the Drone – Multicopter/ Fixed wing/Rotary wing/ Hybrid.

(c)   Launch mechanism  - VTOL/Tube launched/ canister launched and retrieval mechanism.

(d)   Power and propulsion system of the drone (IC engine/battery/hybrid).

(e)   Maximum operating range and endurance of drones with various propulsion systems.

(f)     Maximum take off altitude (in mtr AMSL).

(g)     Maximum operating altitude (in mtr AGL).

(h)     Temperature range in which drones can operate.

(j)     Payload capabilities to include :-

   (i)     Explosive.

   (ii)     ISR (EO/TI/Day/Ni, size, wt, pan , tilt, max rg, resolution, zoom and Field of vision).

   (iii)     Electronic Warfare (Jamming and Direction Finding).

   (iv)     Radio communication relay.

(k)     Can a payload be designed for identification of Friend or Foe with compatible equipment fitted in the 'A' Vehicles?

(l)     Are the drones capable of carrying payload for Direction of own Artillery Fire.

(m)     Video freeze frames and recording of live feed.

(n)     Unladen weight of the drone and weight with payload.

(o)     The life of drones, in terms of landings/ hours, years and battery charging cycles.

(p)     Capabilities like collision avoidance, flocking, foraging and schooling.

(q)     Monitoring of health and location state of each drone on GCS.

(r)     Weight and size of the GCS to check man portability.

(s)     Provision of Remote Video Terminal (RVT) for facilitating MUM-T concept.

(t)     Distributed intelligence behaviours by dividing the specific target area between drones for target search and engagement and navigation.

(u)     Capability of the drones to operate under adverse weather conditions.

(v)     The compatibility of the system with the Defence series maps (when provided) and the map formats used (Raster, Digital Terrain Elevation Data -2 or Vector DGN).

(w)     The navigation system and capability to operate in adverse jamming environment.

(x)     Actual range of communication with and without ADR.

(y)     Various flight modes to include fully autonomous, semi auto mode, loiter mode, target following mode, camera guided mode, manual mode and Return to Home (RTH) mode.

(z)     Whether data encryption is ensured.

(aa)    Simulator software, to assist training without actual flying of drones.

(ab)    Artificial intelligence on GCS as well as on board the drone for Swarming, navigation, targeting based on classifiers.

11.    Any other information relevant to the project not included in the questionnaire may be forwarded.