NETRA V4 UAV

Aerial Vehicle (AV) Characteristics

UAV Weight with battery and max. payload	< 6 kg
UAV Size with Propeller	< 1.5m x 1.5m
Endurance (upto 1000m AMSL Take-Off)	60 minutes with Day payload (upto 1000m AMSL Take-Off) 50 minutes with Mapping payload (upto 1000m AMSL Take-Off) 30 minutes with Day payload at 6000m AMSL Take-Off
Range of live transmission (LOS)	5 km (un-obstructed & interference free)
Typical Cruise Speed	10 m/s
Propulsion	Battery Powered Electric Propulsion
Maximum operating altitude (AGL)	500m AGL (Above Ground Level)
Maximum launch altitude (AMSL)	6000m AMSL (Above Mean Sea Level)
Functional Temperature Range	-10°C to +55°C (Any Govt Lab/DRDO/ NABL accredited Lab certified)
Dust & Drizzle Resistance	IP53 rating (Any Govt Lab/DRDO/ NABL accredited Lab certified)

Aural Signature	<40 Db @300 meters AGL (Any Govt Lab/DRDO/ NABL accredited Lab certified)
Wind Resistance	Upto 10m/s (36kmph or ~20knots)
Technical Life of UAV (Landings)	Minimum 500 landings (OEM Certification)
Launch & Recovery	Autonomous Vertical Take-Off & Landing (VTOL)
Maximum space required for recovery	25m x 25m open area
Area Coverage at 120 m (for mapping applications with 20 MP payload)	Minimum 1.75 sq km at 120 m AGL with 80/60 overlap
Autonomy	Fully autonomous from Take-off to Landing without using any R/C controller
Flight Modes	Altitude Hold Hover at a defined waypoint Autonomous Waypoint Navigation (pre-defined as well as dynamically adjustable waypoints during flight) Remotely Piloted mode (RPV Mode) Real-time Target Tracking of designated static and moving targets
Operating Crew	Maximum 2

Deployment Time	< 10 minutes
Packaging and Storage	Waterproof Backpacks to carry all mission critical components with IP66 or better rating for dust and drizzle protection (Any Govt Lab/DRDO/ NABL accredited Lab certified)
Failsafe features	Auto-Return to Home and Land on Communication Failure Auto-Return to Home and Land on Low Battery Multiple GPS on-board for redundancy Auto-Return to Home and Land on exceeding Wind limit of the system Auto-Return to Home and Land on Battery Imbalance Auto-Return to Home and Land on exceeding the UAV health parameters (Temperature, vibration and throttle limit of the system)
Navigation Lights	Switchable (from GCS)

Payload Characteristics

Payload Options	Daylight HD (1280X720) with 10x optical zoom video payload Thermal 320X240 video payload (Optional) Thermal 640X480 video payload (Optional) Mapping payload (Optional) 20 MP Photogrammetry payload High accuracy L1 & L2 Frequency Band Enabled PPK X, Y Accuracy: <10 cm at 120m AGL (with 95% confidence interval) Z Accuracy: < 20 cm at 120m AGL (with 95% confidence interval) Onboard Storage: Minimum 64 GB (expandable) Dual Payload (Day and TI) - Optional
Video Stabilization	Electronic and Gimbal stabilization of video output at all zoom levels in real-time (Applicable only with surveillance payload)

Payload Replacement Time	< 5 minutes
Payload Control (in flight)	Pan: 360° continuous (with UAV) Tilt: 90° (Only with surveillance payload)
Target Detection Slant Range (Human Size Target)	Daylight: Minimum 800m Thermal(640X480): Minimum 400m Thermal(320X240): Minimum 200m

Ground Control Station (GCS)

3D Maps	Switchable between 2D/3D map views, capability to tilt/rotate 3D map as per user input
GUI Display parameters	Geographic Map along with UAV location, UAV trajectory, camera view polygon, waypoints and flight plan (Applicable only for surveillance payloads) Real-time video from the UAV with on-screen display of important parameters like UAV co-ordinates, target (payload) co-ordinates and range from UAV, true North indication, Distance from HOME, etc. (Applicable only for surveillance payloads) Real-time video displayed at all times during the flight (Applicable only for surveillance payloads) Artificial Horizon indicating UAV attitude
Maps	Capability of working with some publicly available open-source maps. Application has the capability to download maps automatically after specifying location GPS co-ordinates 2D Maps: Capability to integrate geo-referenced raster maps provided in at least one of the commonly used digital map formats (eg. GIF TIFF) as well as shape file (.shp) 3D Maps: Capability to integrate SRTM and DTED based elevation data

Terrain Avoidance	Detects and avoids natural terrain by using elevation data (where available)
Free Hand Annotation	Capability to annotate a desired location on the map screen.
Terrain Hugging	Capability to maintain uniform altitude separation from ground during navigation over non-uniform terrain
No Fly Zone	Ability for user to mark zones which they do not desire the UAV to enter during flight. Also highlights airports in the vicinity and restricts UAV from entering those areas
Geo Fencing	Capability in creating a virtual fence/perimeter for a real-world geographical area. It enables the user in creating a predefined boundary to avoid the RPA venturing beyond the defined area accidentally.
Channel Scan	Ability to estimate the best suited channel for a desired location based on the colour indication for effective flight operations.
User Controls	Take-off/Land without any manual assistance Set altitude of the UAV Waypoint navigation Dynamic flight plan adjustment Point payload to ground co-ordinate function (Applicable only in surveillance payloads RPV Mode which allows UAV to be flown in semi autonomous mode

Joystick Controls	Full camera controls - Pan/Tilt & Zoom In/Out (Applicable only for surveillance payloads) RPV mode Altitude control
Video	Video recorded on the GCS and exported in commonly portable video format (AVI/MP4 etc.). (Applicable only for surveillance payloads) Video of the full flight is recorded by default with option to turn recording off (Applicable only for surveillance payloads) Capability of taking image snapshots with on-screen display parameters at any time during flight (Applicable only for surveillance payloads)
Pre-flight checks	Capability to perform pre-flight checks of the complete system before every flight for confirming the suitability of flightworthiness
Others	Essential telemetry data logging Export of flight path in .kml format for reviewing in Google Earth

Optional GCS Features

Remote Video Streaming	OPTIONAL - Stream Live Video from GCS to remote location over Internet or local network. - Option of ONVIF stream and control at remote location for 3rd party VMS integration. (Applicable only for surveillance payloads)
Moving Target Indication	OPTIONAL - Highlight moving objects in live video display. (Applicable only for surveillance payloads)

Recommended GCS Controller

Type	Laptop or Tablet
Screen Size	Min. 10" diagonal
Functional Temperature Range	-10°C to +55°C (Any Govt Lab/NABL/ILAC accredited Lab certified)
GCS Controller Battery back-up	Atleast 2 full endurance flight without spare battery
IP Rating	IP65

Communication link

Communication link capabilities	Transmit control commands from GCS to UAV Transmit telemetry data from UAV GCS Transmit day and night video from UAV to GCS (Applicable only for surveillance payloads) Secure Communication link between UAV and GCS with 128-bit AES encryption Digital and Encrypted
Auto Tracking Comm Box	Auto tracking directional antenna
Frequency Band	2.4GHz or 5GHz (depending on application)