ARIES 6×6 CUAS20

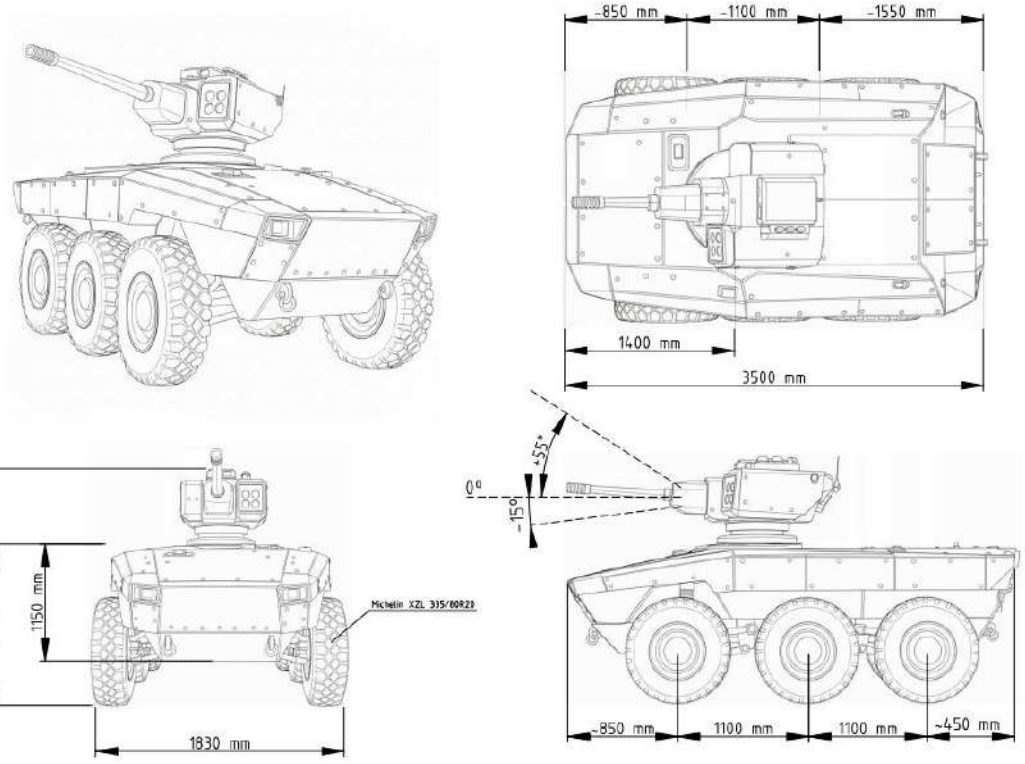
Next-generation, AI-enabled, protected, air-transportable counter-UAS UGV for contested operations, with factory-integrated C-UAS RWS, combining low-signature mobility and 360° situational-awareness to protect units and Medevac/Casevac.

Indicative price: EUR 2.5 million per unit (DAP EU, taxes excluded)
Delivery: Qualification article at T0+15 months; first 10 serial vehicles at T0+24 months;

Scope included

- **Armoured UGV platform (6×6).** 6.0 mm MARS® 500 hull with internal anti-fragment liner (aramid 3–4 kg/m²).
- **Ballistic protection:** STANAG 4569 / AEP-55 Vol 1 Level 1 (7.62×51 mm NATO Ball @ 30 m, 833 ± 10 m/s; fragment threats per AEP-55 tables).
- **Artillery protection:** AEP-55 Vol 1 Level 2 (155 mm HE @ 80 m, hemispherical exposure; fragment/V50 criteria per AEP-55).
- **Underbody: AEP-55 Vol 2 Level 2b (V-hull energy path).**
- **Hull design:** Obliquity on frontal/side plates for effective thickness; V-bottom directing underbody energy away from critical bays. NATO RWS-800 ring with reinforced lid; low-profile weapons bay; recessed service lane for harnessing/maintenance to preserve transport envelope and reduce snag profile.
- **Camouflage & coatings**. IRR NATO low-signature finish in single-tone RAL 8027 F9 (Lederbraun), ultra-matte (gloss ≤5 GU @60°). IRR polyurethane topcoat over epoxy primer on MARS® 500, with micro-texture anti-glint surface.

- **Upper Hull Zoning (Longitudinal):** Nose 850 mm → RWS Zone 1,100 mm → Deck 1,550 mm.
- **Vehicle dimensions (to deck): L×W×H = 3,500 × 1,830 × 1,400 mm.**
- **Hull dimensions (bare hull, V-bottom): L×W×H = 3,500 × 1,830 × 1,150 mm.**
- **Tyres**: Michelin XZL 335/80R20 all-terrain military tyre (Ø ≈1,085 mm, width 335 mm).



- **Propulsion (EV).** Three ZF eTRAC 48 V electric central drive modules (one per axle) with integrated liquid-cooled traction motor and central reduction. Combined output ≈60 kW continuous / 100 kW peak at the wheels. $LiFePO_4$ 60 kWh battery (≈50 kWh usable) feeding dual isolated 48 V traction/aux buses; export power 28 Vdc MIL-STD-1275F 3 kW continuous / 5 kW pico via isolated DC/DC. Liquid cooling with segregated traction and auxiliary loops.
    - **Tractive effort** at ground (firm soil). ≥18 kN continuous / ≥26 kN peak (traction-limited; higher on high-μ paved surfaces).
    - **Gradeability** (GVW 2.25 t). ≥60 % at ≥8 km/h (sustained, 20 °C, firm soil).
    - **Side slope**. ≥45% static stability (as configured; curb CG ≤0.62 m, track ≈1.46 m).
    - **CTIS**. Operational envelope 0.7–2.5 bar; presets for soft-soil "mud/sand" and road transit.
- **Suspension & Steering:** Three ZF eTRAC 48 V electric drive axles configured as rigid axles on trailing-arm suspension with military-grade coil springs and dampers. Electromechanical height jacks for leveling and firing lock. All-wheel steering: axles 1 and 3 full-range, axle 2 ±10° at low speed (coordinated, counter-phase and crab modes).
- **Operation:** road speed **≥60 km/h**; sustained off-road **≥45 km/h**.
- **Fording: 0.5 m**.
- **Towing**: platform can be towed at 80 km/h (on certified road, transport configuration) with automatic decoupling.
- **Drawbar pull:** Not a primary mission. **Unbraked trailer ≤750 kg**, **≤25 km/h** on firm ground; **no towing in fording.**
- **Shock Isolation & Recovery:** Shock-isolated cradles for electronics and battery packs (random vibration **≤7.7 g_rms**, MIL-STD-810H Method 514.8; shock **20 g, 11 ms** half-sine). **Front winch 3.5 t** and rated tow points for self/assisted recovery; FO cutting lines for vegetation.
- **Endurance (EV): silent-watch ≥8-10 h** with autonomy/ISR/FCS at **~3 kW average**; auxiliary-load and FCS/radar duty-cycle policies to preserve watch. **No genset present in this configuration.**
- **Multisensor Management** (IR / Acoustic—airborne & UGV / Visual/RCS):
    - **360° SA camera ring**: high-definition day/night perimeter coverage for remote driving and 360° SA; synchronised streams; point-to-point latency ≤150 ms with packet-loss tolerance; suited for low-latency teleoperation and robust continuity under unstable links.
    - **ISR — RWS-mounted cueing**: passive RF detect/DF (433/868/915 MHz; 1.2/2.4/5.8 GHz) and an acoustic ring integrated in the HORN-20 compact housing; two low-profile 60/77 GHz FMCW micro-Doppler pods on the RWS cheeks (optional). Tracks are published on the LYNX TSN backbone for deterministic cue→slew of the EOS/RWS and for RSK logic. Software enforces

muzzle-blast gating and volumetric occlusion masks. Added mass ≤4 kg; power ≤40 W. Tuned to the 0.6 km defeat envelope; no above-deck radar required.

- **IR**: Thermal shrouds for inverters/e-axles and HV junctions; hot-panel covers; IRR paint; battery/HV "low-plume" conditioning; thermal-masking routines during low-speed approach. (No genset on this configuration.)
- **Acoustic**: Silent EV mode ≤45 dBA @50 m in surveillance; e-axle isolators; low-noise pump/fan maps with "stealth cooling" cycles; CTIS inflate/deflate noise management.
- **Visual/RCS**: Matte IRR coatings and textured camo tarps; anti-glint baffles on FCS optics/LRF; internalised cable runs and low-profile housings on the weapons bay.
- **Reinforced Soft-Kill (RSK)**: Rear-deck integrated multiple launcher box, 15 tubes, elevation +15° to +55°; rear-fixed azimuth; 120–140° sector; time-to-opacity ≤3 s; micro-salvo scheduling; ROE-governed employment to break optical/IR acquisition and deny tracking. Disposable thermal/visual decoys on roof — standard.

- **RWS HORN-20 compact with KNDS 20M621 (20×102):** Low-profile single-barrel mount with **integrated EOS** boresighted to the gun (HD day cam + LWIR/MWIR module, eye-safe LRF class, **5 km** NATO target class). **Line-of-fire two-axis positioning**; **slew 1.5 rad/s**, **accel 1.5 rad/s²**, **minimum rate 0.3 mrad/s**. **Pointing accuracy ≤250 µrad (1σ)**; **system dispersion ≤100 µrad**. **Stabilisation (2 axes) ≤500 µrad (1σ)**. **FCS** onboard with lead, superelevation and firing-angle correction; internal gun/munition tables; parallax/thermal compensation for the integrated EOS. **No wind compensation is declared for 20×102. HITL engagement**, and automatic chassis micro-repositioning. **Single-barrel only (no Gatling).**
  - **Typical power:** surveillance/track **0.3–0.6 kW**; bursts & slew **≤1.2 kW**; feeder **+0.1–0.2 kW**; **design peak 14 kW** (non-sustained) from Aux HV.
  - **Ammunition & C-UAS (20×102):** Qualified **M940 MPT-SD** (V_0 ≈ **1,050 m/s**, self-destruct **~2.3 km** ±10%); compatible with KNDS. Retained for training/other roles: **HEI-T / SAPHEI-T / TP-T** (ballistic match in the FCS).
  - **Mechanical & interfaces: NATO RWS-800** ring; deck reinforcement as specified (S690 **8–10 mm** doubler + gussets). Electrical **28 Vdc MIL-STD-1275F**; data **GbE + CAN-FD / ROS2-DDS**. **Height over deck minimised** for signature and air-mobility constraints.
- **Acceptance (system-of-systems):** EOS↔gun boresight error **≤200 µrad**; end-to-end **Track→Slew→Settle ≤500 ms (p95)**; tracker jitter **≤0.1 mrad RMS @400 m**; SD event logging **≥95%** when out-of-impact.

- **C2 / Network / Security (MUM-T Ready): Redundant Ethernet/TSN backbone** with dual A/B controllers; secure OTA under crypto control; 360° SA ring cameras; cyber/EMI-hardened converters and nodes; HITL firing interlocks, and blue-force no-fire corridors.
    - **Primary control — Full autonomy (AI):**
        - **Assured-PNT (GNSS-denied):** visual-inertial odometry + wheel odometry + 3D LiDAR odometry + terrain-referenced cues.
        - **Behaviours (bounded):** Return-to-Hide; Corridor Waypoints with dynamic geofences; Follow / Bound-Overwatch; Anti-Ambush micro-repositioning; Obstacle detour; Safe-Stop & Park-and-Hide.
        - **Perception & planning:** EO/IR fusion, semantic segmentation, dynamic obstacle tracking; intent-based tasking from operator or manned teammates via Gateway.
        - **Safety case:** MIL-STD-882E hazard analysis; E-stop, remote inhibit, safe-state after loss-of-comms; human-on-the-loop at all times. **Safe-Stop FN = 0** in trials; **FP ≤2/h**. GNSS spoof/jam: fall-back to FO or Safe-Stop per ROE. Degradations (glare/snow/dust/foliage) validated.
    - **Supervisory teleoperation (combat-ready, included):** Low-power LPI/LPD RF and **Fiber-Optic teleoperation**: 20 km shielded integrated spooler guided underbelly rollers with tension/load sensing; pyrotechnic quick-cut and cut-and-reconnect SOP (**KPI: cut→reconnect ≤60 s**). FO video latency **≤80 ms (p95)**; min bend radius ≥30× cable OD; continuous tension ≥30 N (peak ≥60 N ≤10 s). Functions: cross-cueing (sensor↔RWS), LOS slaving, distributed track sharing, corridor-based no-fire enforcement, Follow/Bound-Overwatch with HOTL. Cyber: device identity, ZTA policy, encrypted data-at-rest, tamper detection and dead-man wipe.
    - **Autonomy ODD & Artillery Corridors:** ODD includes dynamic no-go **artillery corridors** using SIGINT/ASCA feeds and tactical overlays; planner prioritises covered approaches and MUM-T bounds.
    - **Multi-Domain Swarm Operations:** Leaderless consensus with failover **≤2 s**; distributed tasking (sensing, relay arcs, deception, C-UAS pickets) and collaborative route planning. Safety via shared no-fire volumes, cross-domain deconfliction and right-of-way rules (air/ground separation minima). Control remains **Autonomy-First per node**; FO teleoperation is per-UGV only (not used for swarm control).
- **Interoperability:** STANAG 4586/4609/4607/4559/4545/4575 supported; BMS/TAK via ICD. CCN-STIC policy for crypto products/services. SATCOM/UAV relay for BLOS when authorised.
- **STANAG 4586 compliance**: LYNX implements CUCS/VSM/DLI/CCI/CCISM/HCI and provides native ingest/export for STANAG. The system supports LOI 2–4 (direct ISR ingest; payload

control; vehicle/waypoint control). LOI 5 is N/A to UGV. Formal 4586 compliance can be supplied under a conformance test plan (Ed.3, Annex B1–B3).

- **Air Mobility: NH90/H175M/H225M/AW139/AW149/SA330 sling compatibility** for ARIES-C-UAS. Four-point rigging to rated hardpoints; CG marked on hull; RWS locked in travel-safe attitude.
- **Configured mass: 2.250 kg.**
- **Deliverables per Unit:** Complete vehicle as per scope; HORN-20 compact with protected feeder and integrated EOS; rear-deck Reinforced Soft-Kill box (single 40 mm bank, 15 tubes) and roof disposable thermal/visual decoys; Autonomy compute stack (edge GPU, safety controller); 3D LiDAR sensor and calibration (included); 360° SA camera ring; Fiber-optic teleoperation set (spooler cassette 20 km, guided underbelly rollers, pyrotechnic quick-cut, FO-FPV encoder/decoder, 2 spare cassettes per vehicle delivered); datasets & simulation environment for customer testing; LYNX C2 licence + Lynx OS onboard (including BMS/TAK ICDs); ICDs/APIs; ILS pack (manuals, LRU list); basic spares (2% RWS/RSK/EO); operator & maintainer training (5 days / 2 crews).

MIRIAD Subsystems - RWS HORN 20 Compact (Hostile Object Remote Neutralizer 20x102)

Purpose. Kinetic C-UAS and force protection in windowed employment under HITL, with no-fire enforcement and full integration into the C2 stack of ARIES.

Architecture & Integration. Stand-alone, two-axis stabilised RWS with **integrated EOS** and **on-board FCS**. LYNX provides tasking/ROE and mission data; the RWS executes stabilised slew and fire-enable under HITL. Time-synchronised network (PTP/IEEE-1588) over Ethernet/TSN on fibre; fixed frame transforms and parallax/thermal compensation are applied locally. Supervisory FO-teleop available; MUM-T gateway publishes corridors and blue-force no-fire volumes to the RWS.

Weapon and mount. KNDS 20M621 (20×102) on NATO RWS-800 ring; reserved clear area Ø1,100 mm; travel locks supplied for air transport. Target module mass (w/o ammo) 250–350 kg; treated as payload (not in base mass).

Weapon & Mount. KNDS 20M621 (20×102) on compact two-axis RWS mounted on NATO-800 ring; reserved clear area Ø1,100 mm; travel locks supplied for air transport. **All ammunition is stowed below-deck** in a low-CG recessed **annular powered magazine** directly under the ring. **C-UAS configuration: 600 rds total.** Feed is via an **armoured, gas-sealed deck-penetrating trunk** from a **sub-deck feeder** to the gun. **Top-deck reload hatch** adjacent to the ring with safe-sector interlocks. The magazine incorporates **vented/frangible** features outboard and sealed bulkheads segregating HV/battery bays.

Gun performance (ARX20 class). Average firing rate **~750 rds/min**; recoil **~250 daN**. Traverse **N×360°**; elevation **−15°/+50°**. Logic power **28 Vdc** (MIL-STD-1275F compliant).

Stabilisation and pointing (on the move). Slew 1.5 rad/s (≈86°/s); acceleration 1.5 rad/s² / 3.0 rad/s² (Fast-Track, short bursts); vmin 0.3 mrad/s; pointing/repeatability ≤250 µrad (1σ).

System dispersion and grouping. Complete system dispersion ≤100 µrad (0.1 mil) bivariate. Practical one-sigma grouping guide: ≈30 mm @300 m; ≈50 mm @500 m; ≈80 mm @800 m.

Fire Control. Full ballistic solution; lead for crossing targets; LRF range-gating; LOS slaving to the mast tracker; pre-fire 3D masking; HITL enforcement; electronic boresight/zero routines; shot-by-shot telemetry for QA. Time-synchronised network (PTP/IEEE-1588) with fixed frame transforms and parallax/thermal compensation.

360° SA Ring — Target Cueing (Recon+). The platform's panoramic day/night camera ring provides close-in motion/looming detection and short-range UAS cueing to the HORN-20 compact EOS. Tracks are fused in LYNX and issue deterministic cue→slew tasks while preserving corridor/no-fire constraints. Typical effective cueing ranges 200–400 m for FPV/multirotors in

clear LOS (condition-dependent). The ring augments—but does not replace—the Recon+ primary ISR sensor. Minimum guaranteed perimeter frame rate ≥10 fps to sustain multi-target fire queues.

Ammunition and C-UAS. M940 MPT-SD (Multi-Purpose Tracer — Self-Destruct), V_o ≈ 1,050 m/s, self-destruct ~2.3 km (±10%), compatible with KNDS 20M621. Training/other roles retained: HEI-T / SAPHEI-T / TP-T with ballistic match in the FCS.

FCS-C-UAS Multi-Target. Track-While-Scan of ≥6 simultaneous tracks with sub-1 auto-classification (FPV/multirotor/fixed-wing). Three (3) concurrent fire queues prioritised by time-to-impact; sustained throughput ≥2 targets/min for 3 min. System pK ≥0.8 @400 m with ≤10-rd bursts using M940-SD**.**

Power and interfaces. 28 Vdc per MIL-STD-1275F. Average 1–2 kW; design peak 14 kW absorbed by an integrated RWS energy buffer (no peak draw requested from vehicle bus). Control: DDS over GigE (TSN-capable); CAN-FD for auxiliaries.

Mechanical integration. NATO RWS-800 ring on an S690 doubler plate 8–10 mm with gussets into the longitudinal members; top-deck stiffness and lid fatigue verified to the burst spectrum. Electrical power at 28 Vdc per MIL-STD-1275F. Data interfaces include Gigabit Ethernet (ROS 2 DDS over TSN-capable network) and CAN-FD for auxiliaries. Height over deck is minimised to meet signature and air-mobility constraints.

Autonomous interplay and masking. If the target enters a blind sector, the chassis planner executes minimum micro-repositioning to clear the mask and re-engage.

Environment, safety and maintenance. MIL-STD-810H (environmental) and EMC/EMI per MIL-STD-461G as certification objectives. Mechanical/EMB brake, safe states on link loss, IFF/tagging hooks. LRU replacement in-cell, diagnostics CBM+, end-of-line tests; shot-by-shot telemetry and health logs over fibre for QA and post-analysis.

Acceptance (subsystem level).

- EOS↔gun boresight ≤ **200 µrad**.
- End-to-end **Track→Slew→Settle ≤ 500 ms (p95)**.
- Tracker jitter **≤ 0.1 mrad RMS @ 400 m**.
- Pointing/repeatability **≤ 250 µrad**; dispersion **≤ 100 µrad** (static).
- **Multi-target tracking:** maintain **≥ 6 simultaneous tracks** with **update latency ≤ 150 ms (p95)** under multi-axis stimulus.
- **Step-response** 0→1.5 rad/s in ≤0.5 s with tracker jitter ≤0.1 mrad RMS @400 m (p95).
- **C-UAS M940-SD** qualification on tethered & free-fly targets at **200 / 400 / 600 m**.

- **Self-destruct (SD) logging ≥ 95%** when out-of-impact.
- **P(hit) ≥ 0.8 @ 400 m** with **≤ 10-rd bursts**, cross-wind **± 5 m/s**.
- Test target: **Group-1/2 UAS surrogate**, frontal area **0.06–0.12 m²**, crossing speed **10–20 m/s**.
- Trials day/night (**VIS + LWIR**); wind measured at **10 m AGL**, **± 5 m/s** with gusts **≤ 8 m/s**.

MIRIAD Subsystems — C2 LYNX

Mission. LYNX is MIRIAD's digital center of gravity. It is built as two complementary layers: **Lynx C2** (command-and-control at HQ/TOC level) and **Lynx OS** (distributed tactical autonomy on each platform). This separation enables centralized cognitive control with decentralized resilience when links are degraded or denied.

Lynx C2 (C2 core). Acts as a tactical BMS/CCS for multi-domain operations, MUM-T and swarming. Runs on Ethernet/TSN with **PTP/IEEE-1588** timing and dual A/B control channels. LOI 2–4 supported per STANAG 4586. Provides interactive COP, dynamic planning and retasking, and AI-assisted workload reduction. Exposes NATO/Spanish interoperability interfaces:

- **CUCS** (mission/sensors/telemetry),
- **VSM** (vehicle gateways),
- **DLI** (data-link abstraction for radio/LTE/MANET/SATCOM),
- **CCI/CCISM** (external C4I and legacy encapsulation), **HCI** (operator console), and
- **AIPM** (AI processing).

Native ingest/export for **STANAG 4586/4609/4607/4559/4545/4575**; **CCN-STIC** crypto policy; **BMS/TAK ICD** available. BLOS control via SATCOM and UAV-relay.

Lynx OS (on-board autonomy). Edge software on every ARIES for point-to-point navigation, assisted micro-repositioning, obstacle avoidance, GNSS-denied operation by LiDAR/INS/visual fusion, safe return, local alerting, cooperative behaviours, secure OTA. Aligned with NATO Autonomous Behavior Layer concepts to preserve doctrinal traceability.

Cybersecurity & extensibility. Multi-layer hardening (verified/secure boot with Ed25519-signed images, allow-listing, APT protection, audit/AAR). Restricted SDK under institutional licence for third-party modules without compromising sovereignty or security.

Cooperative defensive engagement management. LYNX coordinates multi-vehicle defensive actions across ARIES and TAURUS nodes under ROE. It allocates sectors and priorities, maintains a common 3D no-fire mask, and schedules engagements on a PTP/TSN-synchronised timeline. Shooter/illuminator roles and fire queues are arbitrated to prevent shot conflicts and fratricide. Firing remains HITL with dual ROE gating (operator + authorising commander).

Multi-node cueing and salvo control. Tracks from RECON+ (GSR/acoustic/tethered UAV) and NEURON (ESM/EW) are fused/de-duplicated; CHRONOS auto-cues eligible shooters. LYNX

supports synchronous or staggered salvos, cross-platform hand-off, and automatic re-tasking if a shooter drops or a sector closes.

ARIES integration. LYNX provides HITL engagements with automatic chassis micro-repositioning. It fuses ARIES sensors (360° SA camera ring; EO/IR in the HORN-20 compact EOS) and runs a distributed anti-swarm scheduler that assigns and re-balances fire queues per RWS, shares and de-duplicates tracks across ARIES nodes, and publishes dynamic mission corridors and fire/no-fire deconfliction to the effector. Inter-node fusion latency ≤300 ms (p95) and per-hop relay ≤50 ms (p95). Network KPI: TSN backbone packet loss ≤0.1% during concurrent RWS/RSK/FO operation.

CONOPS

Mission. Mobile, AI-enabled short-range C-UAS and close force-protection picket that takes first contact without crews at risk; **air-transportable by sling-load for forward insertion**. Tasks: windowed kinetic C-UAS with M940-SD, multispectral smoke denial, convoy/BTG escort, artillery guard during short halts, protection of engineer crossings, relay-node services, and swarm participation. MUM-T with manned forces is supported but distinct. Primary threat pattern: patrol-zone Class-1/2 UAS with multiple simultaneous aircraft (up to six); ARIES-CUAS is dimensioned for multi-target prosecution while taking first contact without crew exposure

Operating Environment. EW-dense, GNSS-denied/spoofed, FO/FPV saturation, reactive artillery, mine/UXO belts, persistent thermal surveillance; RF is intermittent and targetable. Survivability hinges on low signature, short dwell, micro-repositioning and silent-watch. Engagement window is 200–600 m with short bursts (M940-SD) to control thermal load; dwell is minimised and micro-repositioning breaks pattern-of-life before counter-fires.

Control Paradigm. Autonomy-First within a bounded ODD (Assured-PNT by VIO + wheel + 3D LiDAR + terrain cues). Supervisory fiber-optic teleoperation (included) for precision and RF-denied zones; LPI/LPD RF as tertiary. Loss-of-comms ⇒ Safe-Stop or Return-to-Hide per ROE. Post-penetration denial: data wipe + propulsion inhibit + FO pyro-cut.

Multi-Domain Swarm (UGV/UAS/UGS). Heterogeneous swarm executes a shared mission graph under EMCON. Leaderless consensus with ≤2 s failover; distributed tasking (C-UAS pickets, relay arcs, deception, cooperative route planning). Cross-domain deconfliction enforces right-of-way rules and air/ground separation minima. FO teleop is per-UGV only and never used for swarm control. On picket lines, ARIES nodes also form FO/mission-network relay arcs to extend coverage to the forward team, maintaining TSN loss ≤0.1% under concurrent RWS/RSK/FO operation.

MUM-T. Interop with manned platforms via NGVA/TAK/STANAG gateways: cross-cueing, remote LOS slaving to the **HORN-20 compact EOS**, STANAG media/product exchange, corridor-based blue-force deconfliction. Recon fixes by external assets; IFV/MBT/rotary deliver decisive effects.

Tactics, Techniques, Procedures. Infiltrate under EMCON in electric mode; unspool FO along covered axes. Establish picket lines with micro-offsets every few minutes to break pattern-of-life. Avoid artillery corridors using ASCA overlays and terrain masking. Cueing is EOS-centric on the RWS. When FPV pressure rises, deploy multispectral smoke (≤3 s), launch disposable decoys, execute micro-evasion, then open a short windowed C-UAS engagement with M940-SD strictly inside cleared blue corridors. Exfiltrate; quick-cut FO if compromised (≤60 s); reposition; hand-over. **When operating alone**, cap dwell to short windows, keep the mast down, and enforce **10–**

20 m micro-reposition after each window to minimise signature and counter top-attack geometry. **When operating in pairs or trinomials within the kill zone**, maintain **60–90 m lateral spacing** (and **80–120 m depth** when terrain allows); assign left/centre/right sectors and **rotate sector ownership every window ≤3 min** or after ~60 rounds. LYNX deconflicts arcs, caps **live EO-TWS to ~6 tracks** with **two concurrent fire queues**, parks non-priority tracks, and commands micro-reposition after each window. For CASEVAC screen, deploy VIS/IR smoke (≤3 s), launch decoys, engage at **200–600 m**, then micro-reposition 10–20 m; spacing as above.

C2, Safety, ROE. Human-in-the-loop for any kinetic effect. Blue-force corridor enforcement and safety interlocks are end-to-end in LYNX. Audit-grade logs for C-UAS (tracer/SD), smoke deployment and corridor compliance. EMCON states are mission-driven.

Key Performance Discipline (binding in trials).

- Autonomy interventions ≤0.4 / km within ODD.
- GNSS-denied drift ≤1.5 % / km.
- Track → Slew → Settle (RWS) ≤500 ms p95.
- TSN packet loss ≤0.1 % during RWS/RSK/FO concurrent operation.
- Electric silent-watch ≥8-10 h at ≈3 kW hotel load (no genset).
- C-UAS (M940-SD): system P(hit) ≥0.8 @400 m with ≤10-rd bursts; stabilisation accuracy ≤500 µrad (1σ); SD event logging ≥95 % out-of-impact.
- FO teleop: video latency ≤80 ms p95; cut → reconnect ≤60 s; min bend radius ≥30× OD; terrain MTBCF ≥150 / 100 km-lay (rural / urban).
- Swarm: inter-node fusion latency ≤400 ms p95; team time-sync ≤1 ms p95; coverage completeness ≥95 %; leader failover ≤2 s; zero collisions in formal trials.

Maintenance. Field MTTR ≤30 min for e-axles/ESC, RWS module, FO cassette, RSK box. CBM+ health telemetry. First-line stocks: FO cassettes, smoke, decoys, M940-SD. Sovereign datasets and curation tools maintain autonomy performance; updates loaded as mission preloads.