Abstract

SOFTKILL9000 is a multi-agent, biomimicry-inspired simulation/game engine that stress-tests coordination, triage, routing, and de-escalation in chaotic environments. Agents (e.g., **Longsight**/overwatch, **Lifebinder**/medic, **Specter**/recon, **Whisper**/negotiator, **Archivist**/intel) are deliberately narrow specialists, coordinated via game-theoretic protocols (contract-net auctions, Nash bargaining, potential-game shaping). The system couples **reflex policies** (shielded RL), **deliberative optimisers** (min-cost flow, MPC), and a **domain-Turing layer** that produces role-consistent, causal justifications. Outputs include traceable telemetry, a hash-chained audit log, scorecards (Turing proxy, safety non-violation, throughput), and portable policies (ONNX). In other words: less “pew-pew”, more **measurable, ethical coordination**—with just enough swagger to keep funders awake.

Core Features (abridged, because attention is a finite resource)

- **Biomimetic team design:** octopus-style local autonomy (recon), ant-like stigmergy (routing), bee-quorum negotiation (diplomacy), wolf-pack pursuit (overwatch), termite-style flow control (medical).
- **Game-theoretic coordination:** contract-net tasking, Nash bargaining for corridor selection, shaped potentials for convergent best-responses (i.e., fewer dumb oscillations).
- **Ethics-by-construction:** safety shields (IHL/ROE masks), auditable rationales (goal/constraints/options/choice/evidence), **hash-chained** event log.
- **Domain-Turing layer:** role-specific radio chatter with causal templates; SME-facing explanations that don’t read like a fortune cookie.
- **Policy persistence & portability:** ONNX export/import per role; JSON fallback; online nudging for live demos.
- **Randomised environments:** scenario/terrain/weather randomisation with optional “drift” to test resilience mid-mission.
- **Scorecards for buyers:** Turing proxy, safety non-violation rate, throughput potential—ready for slide 6.

Value Proposition (why anyone sane would pay/play)

- **Operational planning:** Faster, safer routing and triage under partial information; quantifiable trade-offs.
- **Training & doctrine testing:** Low-risk sandbox to probe SOPs, comms loss, and de-escalation outcomes.
- **Compliance & accountability:** Immutable audit trail; clear rationale tuples; ethical constraints visible, not implied.
- **Portability:** Policies run in the browser (planning), in Colab (demos), or on edge hardware (guidance), without ritual sacrifices to the GPU gods.

- **Cost-effective experimentation:** “What-if” campaigns and sensitivity analyses without booking a desert, five drones, and three lawyers.

Who Benefits (and what they call “value”)

- **Humanitarian & disaster response** (UN OCHA/UNHCR/WFP/IFRC, SAR NGOs): casualty-time reduction, corridor safety, transparent ethics.
- **Public safety & infrastructure** (coast guards, wildfire units, utilities): multi-asset coordination; resilient egress planning.
- **Peacekeeping & defence (non-lethal)** (UN PKO tech, DIU/DSTL/DIANA): ISR/extraction planning with rules-locks and auditability.
- **Insurers / logistics / telcos:** agent-based stress tests for outage, supply chains, and catastrophe scenarios.
- **Games & training primes** (CAE, Bohemia, Unity Gov/Industry, AAA R&D): emergent squad AI and moral-dilemma middleware.

Hardware & Deployment Profiles

A) Planning/Demo (cloud or laptop)

- **Spec:** 4 vCPU / 8–16 GB RAM; optional T4/A10 GPU if you insist on heavier RL.
- **Runs:** FastAPI backend + Gradio/Streamlit client, Colab-share via ngrok.
- **Capex:** $0–$300 (cloud credits / modest VM).
- **Opex:** $30–$150 /month (light usage).

B) Developer workstation

- **Spec:** 8–16 cores, 32–64 GB RAM, single RTX 3060–4070 (8–12 GB) or laptop equivalent.
- **Capex:** $1,500–$3,000.
- **Use:** Model iteration, scenario libraries, replay analytics.

C) Edge prototype (non-lethal field tests)

- **Controller:** NVIDIA Jetson Orin Nano/Xavier NX ($399–$999) or x86 NUC ($500–$900).
- **Sensors (à la carte):**
    - RGB + thermal camera: $300–$1,500
    - Depth/LiDAR (short-range): $350–$1,200
    - GNSS + RTK (optional): $200–$900

- **Platforms:**
    - Small **UGV** chassis: $800–$3,000
    - **UAV** dev kit (DJI/ArduPilot-class): $1,200–$3,500
- **Comms:** LTE/5G modem + radio bridge: $200–$600
- **Ballpark Capex (single stack):** $3,000–$8,000 per unit.
- **Opex:** data + maintenance $40–$120/month.

Indicative Software Costs (because spreadsheets win wars)

- **Pilot package (3–6 months):** $120k–$400k depending on scenarios, integrations, and field exercises.
- **Annual licence (enterprise/sovereign):** $75k–$250k + usage (sim hours/agents).
- **Per-mission ops support (advisory, not autonomous weapons):** $5k–$25k per week during live operations.
- **SDK/runtime royalties (embedded):** $100–$500 per edge unit/year or negotiated bulk.

Risks & Mitigations (pre-empt the procurement inquisition)

- **Dual-use anxiety:** Ship **non-lethal** SKUs, action masks, immutable audit; contractual ROE/IHL locks.
- **Model brittleness:** Randomised “drift”, adversarial scenarios, red-team testing; human-in-the-loop control by default.
- **Data protection:** Synthetic/OSINT default; strict PII hygiene; on-prem options.
- **Governance:** Scorecards + audit hashes; reproducible seeds for demos; ONNX exports for external validation.

“SOFTKILL9000 is a biomimetic, game-theoretic squad simulator that turns chaos into quantifiable, ethical decisions—portable from browser to edge, and auditable end-to-end.”