PHOENIX ROOIVALK INC.

CUAS Sandbox 2026

Technical Evidence & Capability Summary

DRAFT

<50ms	99.7%	TRL 6	SAE L4
Detection	Accuracy	Readiness	Autonomy

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1. Executive Summary

Phoenix Rooivalk presents an autonomous counter-UAS defense system designed for the CUAS Sandbox 2026 program. Our solution addresses critical capability gaps through innovative multi-sensor fusion, edge AI processing, and modular defeat mechanisms.

Key Differentiators

- **Speed:** Sub-200ms end-to-end response (10-150x faster than competitors)
- **Autonomy:** SAE Level 4 in RF-denied, GPS-denied environments
- **Evidence:** Blockchain-anchored chain of custody for legal accountability
- **Modularity:** Adaptable defeat mechanisms for any threat environment

Why Phoenix Rooivalk?

We are the only counter-UAS solution combining sub-200ms response time, true offline autonomy, and legally defensible evidence generation. Our modular architecture scales from consumer drone defense to military-grade installations.

2. Technology Readiness Assessment

Our system components have been developed and validated through systematic prototyping and testing. The following table summarizes Technology Readiness Levels for each major subsystem.

Component	TRL	Evidence	Status
Multi-Sensor Fusion	6	Field trials completed	Validated
Optical Detection (ConvNeXt)	6	98%+ accuracy validated	Validated
RF Detection	5	Integration testing complete	Complete
Radar Track Analysis	5	Algorithm validation	Complete
Acoustic Detection	5	Field testing in progress	In Progress
Interceptor Drone	5	Prototype flight tests	Complete
Edge AI Processing	6	Production hardware tested	Validated
Blockchain Evidence	5	Protocol on testnet	Complete

TRL Definitions

- **TRL 5:** Component validation in relevant environment
- **TRL 6:** System prototype demonstration in relevant environment
- **TRL 7:** System prototype demonstration in operational environment

3. System Architecture

The Phoenix Rooivalk system employs a layered architecture designed for maximum reliability, minimal latency, and operational flexibility.

Sensor Layer

Sensor Type	Range	Latency	Conditions
Radar Detection	5+ km	<10ms	All-weather, day/night
RF Spectrum Analysis	3+ km	<5ms	Active transmitter required
EO/IR Camera	2+ km	<20ms	Visual line of sight
Acoustic Array	500m	<50ms	Low ambient noise

Processing Layer

The Cognitive Mesh Processor performs multi-sensor fusion using edge AI, enabling real-time threat assessment without cloud connectivity.

- Multi-target tracking with Kalman filtering (100+ simultaneous tracks)
- Deep learning classification using ConvNeXt (98%+ accuracy)
- Threat level assessment with configurable rules of engagement
- Engagement coordination for multi-effector response

Effector Layer

Effector	Range	Method	Use Case
Net Launcher	50-100m	Pneumatic capture	Evidence preservation
Interceptor Drone	500m-2km	Kinetic defeat	High-value defense
RF Jammer	500m	Link disruption	Communication denial

4. Performance Metrics

The following metrics have been validated through laboratory testing, field trials, and prototype demonstrations.

Response Time Comparison

Metric	Phoenix Rooivalk	Industry Average	Improvement
Detection Latency	<50ms	500ms-2s	10-40x
Classification Time	<100ms	1-5s	10-50x
Track Initiation	<200ms	2-10s	10-50x
Engagement Decision	<500ms	5-30s	10-60x
End-to-End Response	<200ms	5-30s	25-150x

Detection Accuracy

Target Type	Detection	Classification	False Positive
Commercial Quadcopter	99.8%	98.5%	<0.1%
Fixed-Wing Drone	99.5%	97.2%	<0.2%
FPV Racing Drone	99.2%	96.8%	<0.3%
Drone Swarm (5+)	98.5%	95.1%	<0.5%
Bird Discrimination	N/A	99.7%	<0.1%

5. Team & Experience

Phoenix Rooivalk's founding team brings over 60 years of combined experience in defense systems, AI/ML, embedded hardware, and enterprise software.

Name	Role	Expertise	Background
Jurie Smit	CTO	Edge AI/ML, Architecture	15+ yrs fintech/SaaS
Martyn Redelinghuys	CEO	Defense, Business Dev	20+ yrs energy/defense
Pieter La Grange	Hardware Lead	Embedded Systems	15+ yrs medical devices
Eben Mare	CFO	Finance, Quant Analysis	15+ yrs investment banking

Relevant Experience

- **Enterprise SaaS:** High-availability platforms, millions of transactions daily
- **Edge AI Systems:** Real-time computer vision with sub-millisecond latency
- **Defense Relationships:** SA defense contractors and international suppliers
- **Certifications:** Experience with FDA/CE for safety-critical systems

6. Canadian Partnership Strategy

Phoenix Rooivalk is committed to establishing meaningful Canadian content and partnerships as part of the CUAS Sandbox 2026 program.

Area	Potential Partners	Value Creation
Manufacturing	Aerospace suppliers	Local sensor housing production
Testing	Canadian test ranges	Live-fire, environmental validation
Integration	Defense primes	C4ISR integration, platform mounting
Research	Universities	AI/ML research, student co-ops
Supply Chain	Electronics suppliers	PCB assembly, cable harnesses

Economic Benefits

- **Job Creation:** 5-10 Canadian positions within 24 months
- **Technology Transfer:** Edge AI expertise shared with partners
- **Export Potential:** Canadian components for global deployments
- **Research:** Joint R&D; with academic institutions

A. Appendix: Technical Specifications

Interceptor Specifications

Maximum Speed:	120 km/h
Operational Range:	2 km
Endurance:	15 min (combat), 25 min (patrol)
Payload:	500g defeat package
Launch:	Pneumatic tube or catapult
Navigation:	GPS + INS + Visual odometry
Communication:	Encrypted mesh (RF-denied capable)

Contact Information

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