

Sentinel Fixed-Wing

Sentinel Fixed-Wing UAV Mothership

The Sentinel fixed-wing UAV mothership is an airborne sensor and launch platform designed to support c-UAS operations. It carries and deploys systems like Sparrowhawk, provides long-range radar tracking, and hands off target data for guided interception. By combining surveillance, tracking, and launch capabilities in a single platform, the Sentinel UAV mothership enables extended-range engagements, reduced reliance on ground infrastructure, and efficient operation in contested environments.



Performance Specifications

PARAMETER	SPECIFICATION
Type	VTOL Fixed-Wing
Wingspan	269 cm
Flight Time	Up to 2.5 hours; 90 minutes on mission time
Cruise Speed	20 m/s
Maximum Altitude	4000m ASL; Recommended operation up to 2500m ASL
Wind Resistance	10 m/s
Operational Range	108 km
Payload Options	Radar, EO/IR, Interceptor
Environmental Rating	Light rain and snow (drizzle); -20°C to +45°C
Communications	Silvus mesh network integration

Key Capabilities

UAS Detection and Tracking

- ▶ **Radar Payload:** K-band (24.45-24.65 GHz) with 1.5kg weight, compatible with Sentinel Sentry and Sentinel
- ▶ **Detection Performance:** up to 2.5km direct; extended networked range.
- ▶ **Field Coverage:** 120° azimuth × 80° elevation with software defined beam steering; tunable for mission requirements
- ▶ **Clutter Optimization:** proprietary ground clutter and noise filtering on edge
- ▶ **Multi-target tracking:** Simultaneous tracking of multiple platforms within the FOV with discrimination from ground clutter

Visual Confirmation (Dual-Sensor EO/IR)

PARAMETER	SPECIFICATION
Optical Zoom	1920x1080 X80 zoom (X40 optical + X2 digital)
Wide Field of View (WFOV)	60° continuous coverage for area surveillance
Narrow Field of View (NFOV)	1.5° precision zoom for target identification
Digital Field of View (DFOV)	0.75° for long-range reconnaissance
Thermal Imaging	1280×720 resolution (night operations / thermal detection)
Gimbal Pitch Range	-45° to +80° (full vertical coverage)
Gimbal Yaw/Roll	360° continuous rotation
Day/Night Capability	Full EO-IR simultaneous operation



ISR Payload Operational Applications

- ▶ Extended-range day/night reconnaissance (counter-narcotics operations, personnel detection via thermal signatures)
- ▶ Persistent target tracking and surveillance with dual optical-thermal capability
- ▶ Terrain mapping and force protection assessment
- ▶ Border surveillance and area monitoring
- ▶ Dual-use C-UAS + ISR: Swap payload between radar (detection/tracking) and ISR (identification/assessment) based on mission phase

Integration: ISR payloads integrate seamlessly with Sentinel Fixed-Wing platforms. Lightweight design (850g) preserves flight time and range. Multiple ISR payloads included in larger configurations enable simultaneous surveillance of multiple areas.

Air-Launched Interception (Sparrowhawk)

▶ **Platform:** Fixed-wing air-launched design

▶ **Performance:**

Maximum velocity: 60 m/s (216 km/h)

Operational velocity: 45-60 m/s (optimal intercept range)

Flight time: 10 minutes (air-launched) – 90 minutes on Carrier

Operational range: Minimum 5 km from launch point – Extendable to 40km through carrier

▶ **Guidance:**

Initial course: Radar track handoff from Sentinel mothership

Terminal phase: Monocular camera with deep-learning visual tracking

Proportional navigation algorithm for intercept geometry correction

▶ **Detection range:** 1-2km through radar; 500+ meters (visual acquisition); terminal guidance within 500 meters

▶ **Engagement:** Impact detonation with optional remote abort signal; failsafe timer-based detonation

▶ **Telemetry:** LoRa-based command link for operator monitoring and abort authority

Modular Payload Architecture

▶ **Platform-Agnostic Design:** Radar, EO/IR, and interceptor payloads interchange without airframe modification

▶ **Field-Swappable:** Sub-2-minute payload swap capability enabling rapid mission adaptation

▶ **Future Capability:** Architecture supports integration of additional payloads (RF sensors, alternative effectors)



Contested Environment Resilience

▶ **GPS-Denied Navigation:** VNSS (Visual Navigation Satellite System) providing optical-based geo-localization; inertial navigation + LoRa ranging as fallback + Electro-Optical Odometry

▶ **Electronic Warfare Resilience:** Self-healing mesh network with dynamic frequency hopping; encrypted communications; anti-jamming capability (expandable via Silvus licenses)

▶ **Platform Redundancy:** Swarm design ensures coverage continuation if individual platforms are lost

Sentinel-OS GCS:

- Laptop GCS and Body-Worn GCS variants
- Windows 10/11 or Linux compatible
- 5+ hour battery life on ruggedized military laptops
- Compatible with ATAK, Nett Warrior, and other NATO BMS platforms
- SAPIENT compliance for automated data exchange payload between radar (detection/tracking) and ISR (identification/assessment)



Communications Architecture

S-band (2200-2500 MHz), S-band (2200-2500 MHz) + L-band (1350-1440 MHz) or S-band (2200-2500 MHz)
+ C-band (3700-4200 MHz)