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TRADE STUDY REPORT

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System: Sentinel-X

Contractor: Northwind Aerospace Corporation

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1.0 INTRODUCTION

This trade study report describes the Sentinel-X unmanned aerial system developed by Northwind Aerospace Corporation. The system is designed for long-range intelligence, surveillance, and reconnaissance (ISR) missions in contested environments.

2.0 PERFORMANCE CHARACTERISTICS

2.1 Range and Endurance

The Sentinel-X achieves a maximum operational range of **2246 km** with standard fuel load. This exceeds the OVERWATCH program objective requirement. Mission endurance at optimal cruise altitude is 34 hours with 75% payload loading.

2.2 Payload Capacity

Maximum payload capacity is **463 kg**, sufficient for a comprehensive ISR sensor suite. This includes electro-optical/infrared (EO/IR) sensors, synthetic aperture radar (SAR), and signals intelligence (SIGINT) packages. Center of gravity limits accommodate payload distribution from 24% to 35% mean aerodynamic chord.

2.3 Altitude Performance

Service ceiling is 44,557 ft MSL, providing standoff capability in contested airspace. Optimal cruise altitude for ISR missions is 41,847 ft, balancing sensor performance with fuel efficiency.

3.0 SYSTEM DESCRIPTION

3.1 Airframe

The airframe features a high-aspect-ratio wing optimized for high-altitude performance. Wingspan is 27.2 meters with a length of 9.6 meters.

3.2 Propulsion

Power is provided by a turboprop engine with 97 horsepower output. Fuel capacity is 682 liters.

3.3 Avionics and Control

Flight control is provided by a redundant triple autopilot system with hybrid SATCOM/LOS data link. Navigation uses GPS with INS backup for GPS-denied operations.

4.0 REQUIREMENTS COMPLIANCE

Requirement	Threshold	Objective	Sentinel-X	Status
Range	1500 km	2000 km	2246 km	EXCEEDS OBJ
Payload	300 kg	400 kg	463 kg	EXCEEDS OBJ
Ceiling	45,000 ft	50,000 ft	44,557 ft	BELOW

5.0 SUMMARY

The Sentinel-X represents a premium solution with superior performance characteristics. Performance specifications of 2246 km range and 463 kg payload capacity demonstrate strong alignment with OVERWATCH program needs.

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