Netzer

CASE STUDY

The Enabling Precision in a Next-Generation Guided Missile Program

Netzer Precision supported a critical motion-control subsystem within a next-generation guided missile program developed by one of the world's top-tier defense contractors.

By delivering absolute rotary encoders engineered for extreme shock, vibration, and EMI-dense environments, Netzer ensured stable positioning performance from launch through mission execution.

The result: precision that withstands the realities of modern defense systems.

Case Study Snapshot

- **Industry** Defense & Aerospace
- **Application** Precision-guided missile sub-system (position sensing within guidance / stabilization assembly)
- **Environment** High shock (launch), extreme vibration, EMI-dense electronics, wide thermal range
- **Program Context** Full-rate production defense program deployed across multiple platforms
- **Why Failure Was Not an Option** Position error or signal corruption during operation can directly affect targeting accuracy and mission reliability.

The Challenge

Modern defense systems operate in environments that push sensing technology to its limits. Guidance and stabilization assemblies must maintain precise motion feedback while exposed to extreme launch shock, sustained vibration, and dense electromagnetic interference generated by radar and onboard electronics.

At the same time, components must operate across wide temperature ranges (from -40°C to +105°C, with storage up to +125°C) while fitting within tightly constrained mechanical assemblies. Within these conditions, even minor positional instability can degrade guidance accuracy and mission assurance. Once integrated, recalibration is not possible. The encoder must perform reliably throughout the system's lifecycle.

Traditional optical encoders introduce fragility under vibration and contamination, while magnetic encoders are vulnerable to interference in EMI-heavy environments. The subsystem required a sensing solution capable of combining extreme robustness with sub-millidegree precision.

The Netzer Solution

Netzer delivered a harsh-environment encoder architecture based on its VL and DS technology platforms, specifically designed for mission-critical defense applications.

At the core of the solution is Netzer's contactless capacitive sensing technology, which provides absolute rotary position feedback without mechanical wear. Unlike magnetic-based technologies, capacitive sensing is inherently immune to magnetic interference and maintains signal integrity in EMI-rich environments.

Integrated temperature-compensation capabilities ensure stable positional accuracy despite thermal expansion, contraction, and rapid environmental changes, enabling reliable operation from storage conditions through active deployment.

To support different subsystem architectures and environmental requirements, Netzer offers several encoder families commonly used in demanding defense applications:

VLP Series
Hollow-shaft, low-profile design

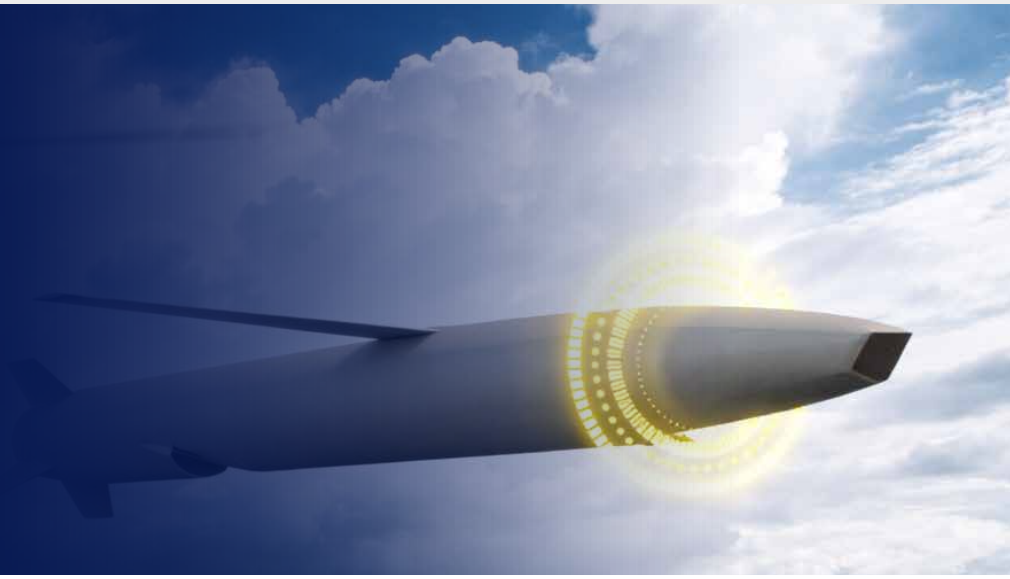
DS Series
Encapsulated protection for environmental exposure

VLT Series
Extended thermal capability up to +125°C

DL Series
High-resolution spindle-shaft encoder (18–22 bit)

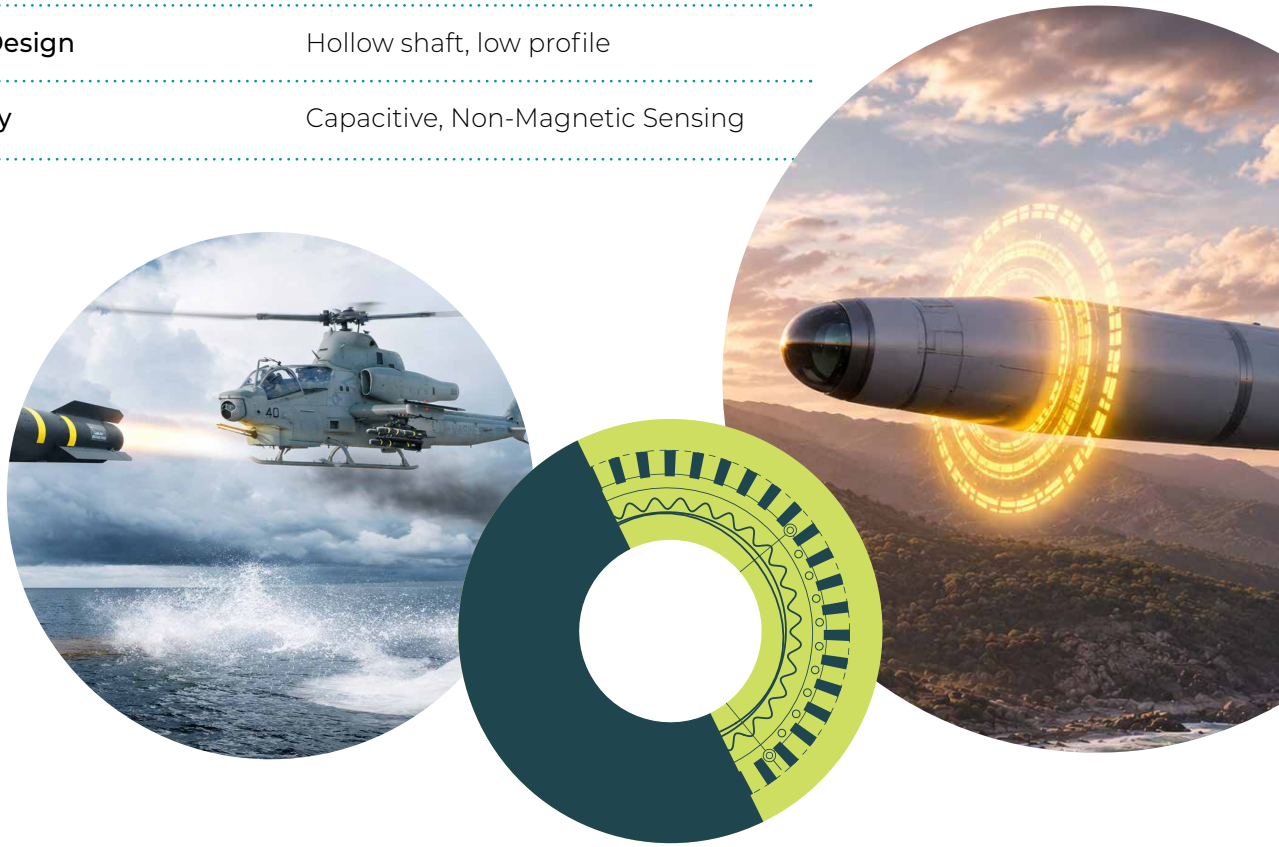
These encoders provide high-precision feedback in compact form factors, starting as small as 13 mm - enabling integration without compromising mechanical stability or performance.

The result was a production-ready encoder solution delivering reliable, high-precision position feedback under extreme operational conditions.



Key Performance Characteristics

Capability	Performance
Accuracy & Repeatability	< 0.006°
Operating Temperature	-55°C to +125°C
Storage Temperature	Up to +125°C
Shock Resistance	100g
Vibration Resistance	7.7 grms
Communication Interfaces	SSI / BiSS-C
Mechanical Design	Hollow shaft, low profile
EMI Immunity	Capacitive, Non-Magnetic Sensing



Key Takeaway

Next-generation defense systems depend on sensing technologies that can maintain precision under extreme operational stress.

By combining contactless capacitive sensing, integrated temperature compensation, and harsh-environment encoder architectures, Netzer delivered reliable absolute position feedback for a mission-critical guided missile subsystem.

Precision engineered to perform from launch through mission execution.

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Contact us for more information

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