



## **Detailed technical description of Stabilization in drive mode**

### **Mobile Surveillance Deployment and Stabilization while the vehicle is in motion at speeds of up to 60 km/h**

#### **1. Deployment and Elevation**

OPTIX Mobile surveillance system is designed for dynamic operation & rapid, on-the-move deployment, capable of delivering superior high-quality situational awareness while the vehicle is in motion at speeds of up to 60 km/h.

OPTIX Mobile surveillance system stands as a pinnacle of engineering excellence, representing the culmination of decades of intensive research & development, underpinned by a legacy of field-proven expertise in high-precision optronics and mission-critical stabilization technologies.

The specially designed OPTIX lifting mechanism allows the OPTIX MS One-V multi-sensor system to transition from a concealed, weather-protected stowed position inside the vehicle to an active state above the vehicle's roofline while traveling at speeds up to 60 km/h.

The process begins with an operator's command from its operator's place inside the vehicle.

The OPTIX Mobile surveillance system utilizes a high-precision specially designed OPTIX lifting mechanism engineered to withstand the significant aerodynamic drag encountered at speeds of 60 km/h. The mechanism is engineered to ensure a rigid vertical extension, minimizing mechanical sway and maintaining structural integrity against high aerodynamic loads during transit across rugged or off-road terrain.

The OPTIX lifting mechanism is initiated from within the vehicle's interior.

Upon activation, the assembly transitions from its stowed, protected transport position within the vehicle's body to its fully extended state via a synchronized vertical stroke.

The OPTIX pan/tilt device, which integrates the OPTIX MS One-V multi-sensor system payload, is vertically elevated through the roof's specialized hatch until it reaches its operational height above the vehicle's roofline.

This high-precision movement is governed by an OPTIX automated control interface that monitors the structural load, ensuring that the OPTIX pan/tilt unit clears the roofline safely while maintaining a rigid vertical axis to minimize mechanical oscillation during the transition.

In this fully retracted mode, the specially designed OPTIX damper sealing hatch automatically closes to fully weather-protect the inner space inside the vehicle.



## 2. OPTIX MS One-V Multi-Sensor Surveillance

The OPTIX MS One-V Multi-Sensor system payload features a high-performance OPTIX cameras suite for comprehensive situational awareness:

Once elevated, the OPTIX MS One-V Multi-Sensor system provides comprehensive situational awareness through its dual-sensor configuration:

- **MWIR Cooled Thermal Imaging Camera:** Provides high-contrast detection in low-light, total darkness, or obscured atmospheric conditions (smoke/fog).
- **Day Color Camera:** Delivers high-resolution visual identification and forensic-quality detail during daylight operations.

The integrated OPTIX MS One-V Multi-Sensor system payload is engineered for multi-spectral awareness, allowing the operator to toggle between the MWIR (Middle-Wave Infrared) cooled thermal sensor and the high-definition CMOS day color sensor. This dual-channel capability ensures that the system can maintain a continuous "lock" on targets even when moving through varying light environments, such as entering tunnels or passing through shaded forest corridors. Furthermore, the optical sensors are perfectly boresighted to a common focal point, ensuring that when the operator switches between the thermal and day views, the target remains centered and in focus. This sensor configuration provides a robust tactical advantage, enabling the detection of heat signatures at long ranges followed by immediate visual confirmation and license plate observation using the day camera's powerful optical zoom.

## 3. Advanced Image Stabilization

To ensure a clear, actionable video jitter-free feed while navigating uneven terrain or traveling at speeds up to 60 km/h, the OPTIX MS One-V Multi-Sensor system employs dual-layer stabilization architecture:

- **OPTIX Hardware (Two-Axis Gyro-Stabilization):** High-torque motors and inertial sensors physically stabilize the payload in the pitch and yaw axes, counteracting the vehicle's motion. The 2-axis gyro-stabilized OPTIX pan/tilt mechanism utilizes integrated gyroscopes to physically counteract vehicle vibrations, pitch, and roll in real-time. This ensures the optical axis remains locked on the target.
- **OPTIX Software (Image Stabilization Algorithms):** Advanced software algorithms a.k.a. OPTIX In-Motion perform real-time image processing to remove residual vibrations and digital noise. The video feed is further processed by specialized software algorithms. The special OPTIX digital filters remove high-frequency jitters and residual motion blur, resulting in a fluid, broadcast-quality image for the operator.

The system's stabilization architecture is designed to mitigate the complex inertial forces and high-frequency vibrations inherent in high-speed mobile transit. The two-axis gyro-stabilized OPTIX pan/tilt unit utilizes high-torque brushless motors and sensitive inertial measurement units (IMUs) to execute instantaneous counter-adjustments for pitch and yaw movements. Complementing this mechanical foundation, the image stabilization OPTIX software employs sophisticated frame-to-frame registration and



electronic image stabilization (EIS) techniques. These OPTIX algorithms analyze the video stream in real-time, compensating for rolling shutter effects and residual pixel-shift caused by wind buffeting or sudden vehicle acceleration. The result is a stabilized, geocentrically locked video feed that allows for high-magnification observation and precise target tracking even while navigating challenging road conditions at maximum operational speed.

#### 4. Operator Interface and Control

The OPTIX Mobile surveillance system is managed from within the vehicle cabin via the built-in workstation PC with display. The operator uses a multifunction joystick to manage sensor selection, zoom, and pan/tilt movement, allowing for high-precision surveillance without exposing personnel to the external environment.

Upon mission completion, a single operator command initiates the retraction sequence, reversing the deployment process to return the system to its stowed position.

The mechanism ensures a controlled descent, securely seating the payload within the vehicle's body and re-engaging the automated sealing hatch to provide total environmental protection during high-speed transit or storage.

With OPTIX the mission is successfully complete!