



Force Protection 2.0: The Use of Autonomous UGVs for the Security of Airports, Ammunition Depots, and Military Installations

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The protection of critical military infrastructures is evolving towards the integration of autonomous ground assets. The introduction of UGVs (Unmanned Ground Vehicles) equipped with artificial intelligence opens new perspectives for human-machine *teaming*, optimizing the surveillance of air bases, ammunition depots, and barracks, and freeing personnel for high-value operational tasks.

The modern concept of *Force Protection* requires increasingly technologically advanced responses to ensure the perimeter and internal security of military installations. In this context, *Dual-Use* technologies of civilian origin offer COTS (Commercial Off-The-Shelf) solutions of immediate interest to Defense. A notable example is the recent implementation in the logistics field of "Fortify", a patrol UGV presented by the Italian Forte Secur Group, whose operational

characteristics perfectly meet the security requirements of critical military infrastructures.

Sensors and Integration in C4ISR

The system is configured as a true mobile "sensor node", integrable into the base's command and control systems (C4ISR). Its *sensor fusion* architecture ensures uninterrupted *Situational Awareness* (24/7):

- **Thermal and Optical Imaging:** The 360-degree vision, combined with thermal sensors, is essential for nighttime operations and detecting intrusions or thermal anomalies in any weather condition.
- **LIDAR and Autonomous Navigation:** The three-dimensional mapping of the environment allows the asset to move autonomously within complex perimeters, overcoming obstacles up to 13 centimeters and managing pre-programmed or dynamic patrol routes.
- **Artificial Intelligence (*Edge Computing*):** The onboard algorithms do not just transmit video but process data in real-time to identify tactical anomalies: unauthorized vehicles, breaches in perimeter fences, or forced doors, sending an immediate *Early Warning* signal to the Guard Corps.

Deployment Scenarios for the Armed Forces

The use of such a system finds an ideal application in three critical infrastructure domains for the Ministry of Defense:

1. **Military Airports and Air Bases:** Air bases are characterized by vast perimeters and highly sensitive flight areas (flight lines, runways, fuel depots). The UGV can conduct constant patrols of the *taxiways* and boundaries, detecting intrusions (anti-sabotage function) or identifying potential debris (FOD - *Foreign Object Debris*) that could compromise aircraft safety.
2. **Ammunition Depots:** The control of ammunition depots involves high risks for personnel and requires continuous surveillance in often isolated areas. The use of *unmanned* assets drastically reduces the risk exposure for human sentinels. Additionally, the UGV's thermal cameras can detect abnormal temperature variations in the depots, acting as a preventive alarm system against the risk of ignitions or fires.

3. **Barracks and Military Complexes:** In the daily management of barracks security, the UGV can be used for night patrols or for controlling logistics areas and vehicle parks. Its microphone and speaker equipment also allows for remote interaction or acoustic *deterrence* directly from the Operations Room.

Manned-Unmanned Teaming and Force Optimization

From a doctrinal perspective, the inclusion of patrol robots is not aimed at replacing military personnel but at realizing the concept of *Manned-Unmanned Teaming*. The system's operational autonomy (estimated between 8 and 10 hours) allows the machine to take on the most exhausting and repetitive surveillance tasks.

This approach guarantees two immediate strategic advantages:

- **Force Economy:** It significantly reduces the numerical employment of soldiers in guard and sentry shifts, freeing valuable personnel to be reassigned to training and operational readiness (in line with the need to sustain the reserve and maneuver forces).
- **Cost Efficiency:** The use of autonomous systems for base surveillance allows for a reduction in structural management costs (estimated around 30%), optimizing Defense budget resources.

In conclusion, the acquisition and adaptation of *off-the-shelf* robotic platforms for 2.0 surveillance represents a pragmatic and necessary step for the technological modernization of Defense, raising *Force Protection* standards and optimizing the use of the human factor.