The use of unmanned systems is increasing in a wide range of commercial and military platforms. From small, man-portable robots used for scouting and IED mitigation, to unmanned vehicles transporting supplies and on to terrain surveillance, unmanned systems are being successfully deployed in a variety of operational scenarios. Today, these systems are moving inevitably from remote control operation to increasing levels of autonomy, requiring real-time object detection and classification.

Elbit Systems’ Stereo Vision System (SVS) is a comprehensive solution that allows unmanned ground vehicles to autonomously detect and classify image-based objects. With a significantly lower total cost of ownership (TCO) than competing systems, the SVS features the latest innovations in hardware, software and robotic imaging technology. The SVS is ideal for ground platforms that require autonomous perception capabilities - including a wide range of military, industrial and commercial vehicles.
Stereo Vision System (SVS)
Image-based object detection and classification for unmanned systems

Developed in-house and backed by Elbit Systems’ more than ten years of experience as a major player in the field of robotics, the SVS is field-proven and fully operational in a number of unmanned systems worldwide.

- **Advanced software for on-target detection** – The SVS utilizes a range of advanced algorithms to provide superior object detection, including road plane extraction; object segmentation; object size, distance and speed estimation; object tracking, including history management and identity preservation; as well as local feature detection, description and matching for robust tracking capabilities.

- **High level of accuracy** – The system employs a range of offline calibration techniques to ensure high quality imaging, including camera calibration that focuses on calculating radial distortions and focal length. For further accuracy, the system also utilizes rig calibration to set the camera’s relative position and orientation. The SVS creates clouds of points (CoP) for distortion correction; rectification of virtual cameras; GPU-based sub-pixel dense tracking; trust level calculation to detect performance reductions; and automated calibration correction.

- **Built for performance excellence** – The SVS features a high-speed frame frequency rate of 13Hz, and a wide detection range of 60m for objects measuring 50 x 50cm. The system’s distance estimation error is less than 1%.

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### Technical Specifications

- **Cameras**: Synchronized Prosilica GC1290M highly sensitive, 30 frames per second, Gigabit Ethernet cameras based on the Sony ICX445ALA
- **Lenses**: 4mm focal length, 60° x 40° FOV
- **Installation**: 80-100cm distance between cameras, with sealed and nitrogenized enclosure
- **System Memory**: 2GB DDR3
- **Power Consumption**: 150 Watt, typical for basic configuration
- **Dimensions**: 12.06 x 10 x 3.02 inch
- **Operation Temperature**: -20°C to + 55°C
- **EMI**: MIL-STD-461E
- **Environmental**: MIL-STD-810F

### Key Features

- Autonomously detects and classifies image-based objects
- High-speed frame frequency
- Wide detection range
- Low distance estimation error
- Offline calibration
- CoP creation
- Robust techniques for objects detection

### Key Benefits

- Low TCO
- Developed in-house
- Suitable for a range of unmanned vehicles and applications
- Fully field-proven