

# Mobile Border Surveillance – ALERT Truck

Perimeters and [borders](#) are getting more and more complicated to defend, and at the same time, security budgets are not increasing to allow for added manpower or equipment. One solution to this problem is the use of mobile surveillance platforms. These platforms, typically truck- or trailer-based, provide increased surveillance during critical times and allow flexible incident response, without the large infrastructure costs and time required to install a complete fixed sensor perimeter. In response to this need, security technology companies are implementing an integrated sensor approach to ensure there is no compromise when these mobile platforms are compared to traditional fixed sensor systems. This includes detection performance, sensor accuracy and response capability.

## MOBILE SOLUTIONS

The ability to be “mobile” mandates the ability to move to various locations, often via rugged terrain; quick set up on non-level locations; easy stowage; independent power; and connectivity to other platforms and users. A recent entry into the mobile platform market, the ALERT Truck, uses an off-road truck chassis coupled with a self-leveling mast to provide the foundation for a surveillance platform that is rapidly deployable in a wide range of challenging environments, including deployments at extreme terrain angles.

Critical to the success of mobile platforms, the system eliminates the need for calibration. A touch of a button deploys the ALERT Self Leveling Tower mast by U.S. Towers, which is able to automatically tilt, level, extend and be fully operative in less than 2 minutes. The surveillance suite, which can also self-calibrate, includes multiple sensors (SR Hawk™ ground surveillance radar by SRC Inc., Night Hawk thermal/visible camera suite by PVP Advanced Electro-Optical systems, Inc, [PureActiv®](#) geospatial video analytics by PureTech Systems, laser range finder and GPS), as well as a complete [command and control VMS software](#) integrated into a mobile vehicle platform.



Today's mobile surveillance platforms deliver the same level of detection performance, sensor accuracy and response capability as their fixed sensor counterparts

## SMARTER SENSORS THROUGH GEOSPATIAL COLLABORATION

However, rapid deployment is only part of the problem. A mobile platform must be able to provide the same wealth of detection data as fixed sensors, without sacrificing accuracy or incident response capability. In the case of the ALERT Truck, this is achieved by integrating commercially available sensors into a fully-collaborative, intelligent system. This integration goes beyond a single control and data display interface, allowing the sensors to collaborate information related to intruders or Items of Interest (IOI). This ability to share data improves the

accuracy of detection, increases associated details assigned to each target, reduces false alarms and declutters the user interface.

The unique approach used to easily and accurately combine the platform’s sensor data is the sharing and collaboration through the use of a common operating picture, mainly a physical coordinate system. A “geospatial” or location-based design adds latitude, longitude and elevation data to all IOIs, as well as sensor control and target display data. This result is an effective means for all detection sensors on the mobile suite to communicate sensor information and target details using a common geospatial command set.

Furthermore, when traditional alarm information (aka “time” and “target”) is shared in real time with location information, this allows the system to calculate many additional attributes of the target, including real size, real location, current speed, current direction, past location, object classification and even acceleration. All this target information can be analyzed and compared amongst the various sensors to provide a highly accurate data set for each IOI.

### MAP-BASED DISPLAY & CONTROL

In addition to collaborating target data when raising alarms, a geospatial user interface, such as the PureTech Systems’ PureActiv® Command & Control featured in the ALERT Truck suite, provides a visual means to quickly assess a situation in a simple map-based interface, including the merging of track data obtained from several sensors into a single condensed track. This provides the most accurate representation of the IOI and its path, without confusing the operator with multiple sensor tracks from overlapping sensor coverage that may represent the same target.

The display of sensor location, sensor state and target information on a map-based GUI is only part of the advantages provided by a geospatial system. Sensors typically used for event interrogation (e.g PTZ cameras) can also be enabled to be geospatial, allowing them to be monitored and controlled using latitude and longitude information. In addition to dynamically displaying the details of a detected IOI, a geospatial system can use these same tracks as cues to point interrogation sensors directly to the location of the security event. The operator can [merely click on the target, or its location on the map](#), and the camera will [automatically steer](#) to the target - adjusting its pan, tilt and zoom for optimal viewing. This is especially helpful in a mobile platform, where it may not be unusual for the platform to be manned by a single operator.



Mobile platforms based on geospatial technology systems such as the one featured in the ALERT Truck suite, provide a visual means to quickly assess a situation in an easy to read map-based interface.

This common geospatial reference system also facilitates the ability for the system to automate many tasks that previously required operator control, common detection scenario can be fully automated:

- Upon system deployment, the radar automatically identifies potential targets
- The software steers IR and/or visible cameras to that target's location for identification
- The operator tags the target as **friend or foe**, storing the classification in the system
- **Camera auto follow**, using a combination of radar and video analytics, locks on and automatically follows suspicious targets for continuous monitoring.
- Combined track data is also updated in real time on a map-based display
- Target information is collected and correlated from all sensors, then communicated with the entire response team.

### LONG RANGE ACCURACY

Although applicable to a variety of deployments, mobile platforms are widely used for border surveillance. These deployments call for long range detection and accuracies. To further ensure that the mobile suite performs at or above the levels of its fixed counterparts, even at these extended ranges, range finders combined with high precision camera gimbles are added to provide an additional level of performance. Maneuvering a camera at ranges over 5 miles dictates not only extremely accurate detection sensors (radar + video analytics), but also requires precision pointing accuracy to steer a camera to the location, and advanced control algorithms to follow this target through micro-size camera movements.

This added precision is accomplished through the addition of a range finder, which collaborates with the radar and geospatial video analytics to compute accurate distance to a target, which in turn increases the confidence levels in corresponding data – location, target size, target speed, target track, etc. The ability to then obtain visual confirmation of the target, via a slew to cue of the camera and subsequent auto tracking, is enabled by highly accurate position encoders integrated with the cameras, which provide positioning up to 0.0006°.

### CONCLUSION

Today's surveillance needs have moved beyond the traditional fixed camera on a fence line. Sensors need to be smart, easy to set up, collaborative and able to move rapidly as threats move. The ALERT Truck system is an excellent example of how this can be achieved cost effectively in a single platform by leveraging geospatial technology with intelligent video, radar, precision distance and highly accurate cameras to create a mobile surveillance platform that delivers the same, or higher, detection capability and accuracy as its fixed location sensor brethren.



Today's mobile platforms can automate many tasks that previously required operator control, such as steering cameras to other sensor detections and automatically tracking targets.

**ALERT TRUCK SENSOR SYSTEM SPECIFICATIONS**

<b>SPECIFICATIONS</b>	
Extended Height	Up to 40 feet
Max mast payload	225 pounds
Total system weight with surveillance payload	<1000 pounds
Design wind speed	65 miles per hour
<b>Sensor Characteristics</b>	
HD or SD IR cameras with 200-1200mm continuous zoom	
HD Visible camera with 2000mm zoom lens	
<ul style="list-style-type: none"> <li>• Optional 20km laser range finder</li> <li>• Optional 15km eye safe laser pointer</li> <li>• Optional Video contrast tracker</li> </ul>	
Radar	SRC Hawk
Command and Control	PureTech Systems
Video Analytics	PureTech Systems
Environment	Outdoor / Marine to MIL-STD-810 <ul style="list-style-type: none"> <li>• Humidity, Salt, Fog, Solar Loading, Blowing Sand/Dust, and Blowing Rain</li> <li>• Temperature: -40°C to +74°C</li> <li>• Relative Humidity: 100%, validated with a complete immersion test on all units</li> <li>• Vibration: 3grms 50-500 Hz</li> </ul>



ALERT Truck Features & Benefits
High performance imaging sensors integrated with a self-leveling mast for rapid deployment in challenging environments
Stationary and on the move operation
Modular design with all components configured as line replaceable units for the lowest life cycle cost.
Can be deployed and operated by a single user without leaving the vehicle
The system can be stowed for transport without leaving the vehicle
Long-range performance (man-size target detection >20 km and vehicle detection >40 km)
Map-Based Command and Control / Complete Video Management capabilities
See objects in complete darkness and adverse weather conditions
Continuous 360 ° rotation
Slew to camera/radar with Autonomous Camera Follow
Fully network enabled for integration into existing IP surveillance networks
Video detection, target classification and alarm management
Direct drive servomotors provide superior control in narrow FOV
19-bit absolute encoder provides excellent accuracy (0.0006°) and control

## NEXT STEPS FROM PURETECH SYSTEMS



### 8 Things to Consider When Designing a Camera Perimeter:

There are many guidelines that have been released that provide information as to the type of security measures that should be considered when protecting these facilities. However, the details involved with making these measures a reality are often missing. This paper presents [8 things to consider](#) when designing a camera-based security system, or when reviewing your existing one.



**Border Protection:** Controlling borders or large critical perimeters calls for knowledgeable personnel and accurate sensors that work together to quickly assess a situation and react to it. This [white paper](#) looks at how a geospatial video management system is uniquely aligned to can address these needs. Read the [White Paper](#).



### Automatic Threat Assessment – Identification: Friend or Foe:

Automatic Threat Assessment or IFF, is the ability to automatically acknowledge alarms created by friendly assets. This [white paper](#) outlines how the addition of a tracking system associated with ‘friendly’ vehicles and personnel can provide the missing information necessary to tighten security, reduce the need to take action on alarms caused by friendly targets, while reducing the cost of threat assessment.

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## About PureTech Systems

PureTech Systems Inc. is a manufacturer of wide-area perimeter surveillance software solutions including internally developed outdoor video analytics, PTZ Auto Follow, multi-sensor integration and a map-based (real object size) command and control. It is offered to fortune 1000 firms, military, petro-chemical, water and electric utilities, seaports, airports and federal, state and local governments. With headquarters in Phoenix Arizona, PureTech Systems serves national and international markets. To find out more about PureTech Systems Inc. visit our website at [www.puretechsystems.com](http://www.puretechsystems.com), follow us on [Twitter](#) @PureTechSystems or sign up for our [email list](#).

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