

Geospatially Integrated Surveillance Systems

Kevin Campbell

Vice President Sales

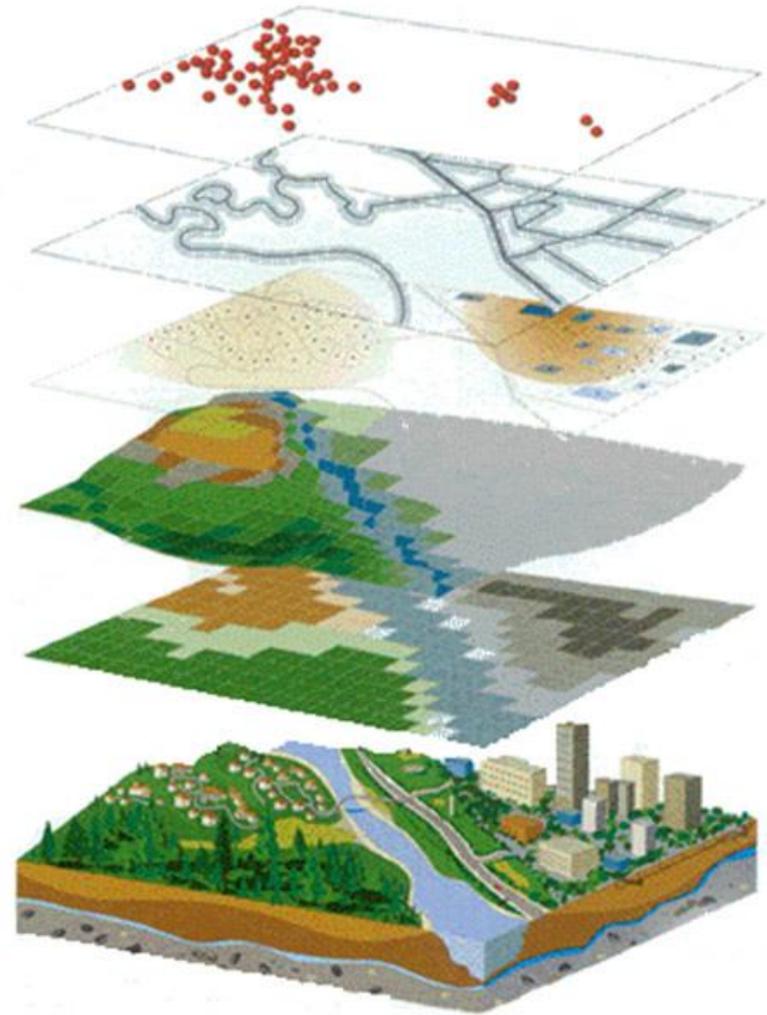
Kevin.Campbell@PureTechSystems.com

O: 602-424-9842 x118

www.puretechsystems.com

Detect – Analyze – Respond

- What is Geospatial?
- Geospatial Perimeter Sensors
- Integrating Sensors for better awareness and efficiency



geospatial

Syllabification: (ge·o·spa·tial)

Pronunciation: / ˌjēōˈspāʃhəl/

Definition of **geospatial**

adjective

Geography

relating to or denoting data that is associated with a particular location.

What Makes a Surveillance System “Geospatial?”



- Map Based Presentation of Data (AKA GUI)
 - Sensor Location (Static, Often Dynamic)
 - Target Information (Location, Type, Distance)
 - Map Based control and sensor interaction
- Sensor Data includes “Real World Position” data
 - In Real Time
 - And in Meta Data (Database Information)
- Integrated Sensors – Sharing of positional information
- Ability to use this data in real time and forensically

Geospatial User Interface



PureActiv Workstation AlertView 10

File View Tools Window Help

Layout: Select...

Video Palette

Dynamic Sensor Control

Target Tracking

Radar

Map with live camera views and tracked objects.

Geospatial Alarm Detail

Alarm Monitor

Alarm Time	Source	Description	Sev.
02/13/2013 16:10:42		Motion Detected	
02/13/2013 16:10:42		Replay	
02/13/2013 16:10:42		Live Video	

02/13/2013 15:57:21 15:57:21.000

February 13 33.67810, -112.10097, 432.3m 229.17m x 176.14m

Alarm Monitor Alarm Triggering

Track Properties Cameras and Groups Alarm Cameras

The screenshot displays a complex geospatial user interface. At the top, a menu bar includes 'File', 'View', 'Tools', 'Window', and 'Help'. Below this is a 'Video Palette' with various camera icons. The main area is a satellite map of a harbor and industrial area. Annotations include 'Dynamic Sensor Control' with green arrows pointing to sensor locations, 'Target Tracking' with red lines and vehicle icons, and 'Radar' with white arcs. A 'Map with live camera views and tracked objects' callout points to a live video feed of a container yard. An 'Alarm Monitor' panel at the bottom features a table with columns for 'Alarm Time', 'Source', 'Description', and 'Sev.', and buttons for 'Clear', 'Dismiss Without Clearing', 'Center Alarm On Map', and 'Popup Media'. A 'Geospatial Alarm Detail' callout points to the alarm table. The bottom status bar shows coordinates and dimensions.

The background of the image is a detailed architectural blueprint. It features a grid of lines, various geometric shapes, and technical drawings. A yellow measuring tape is visible in the upper right quadrant, and a purple pen lies horizontally across the middle. A semi-transparent purple rounded rectangle is centered over the blueprint, containing white text. The text is arranged in three lines, with the first line being the longest and the second and third lines being shorter, creating a centered, stacked appearance.

What Security Sensors
are Considered
Geospatial?

Geospatial Security Sensors



Radar



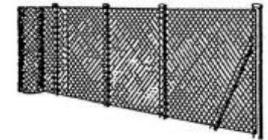
GPS



Smart Phones



Security Cameras



Intelligent Fence Sensors



RFID



Beam Break Detectors



Access Control





How Geospatial can help Seaports?

“Georeferencing” allows fixed cameras to be *geospatial*

- Enabling security cameras to be short range radars



Camera Information

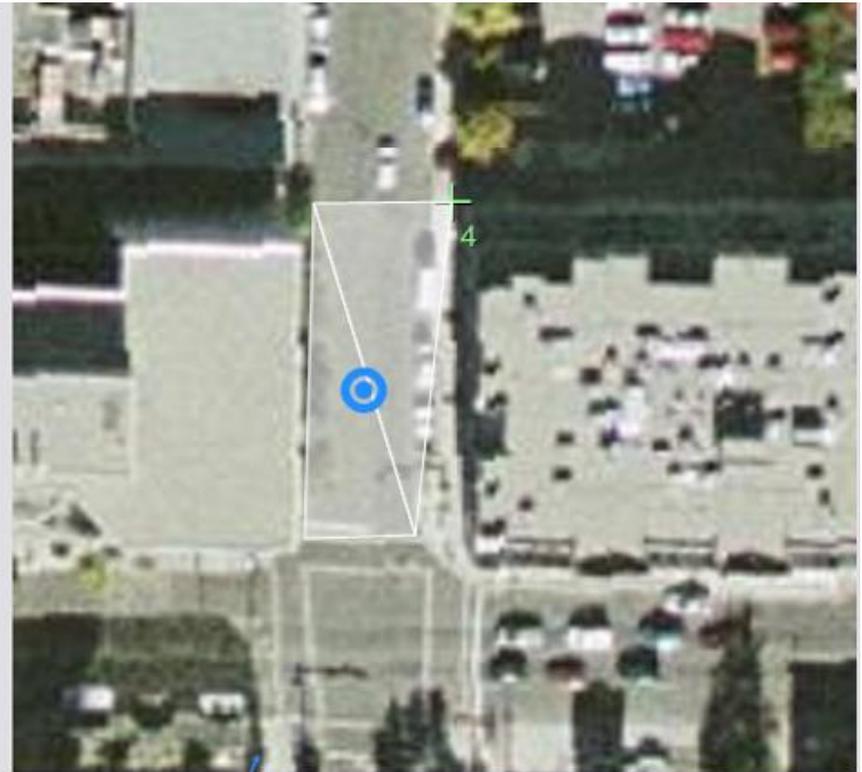
Pan: 207.5°, Tilt: 13.5°, Zoom: 1.6X

Lat: 51.042618°, Long: -114.076739° Elevation: 11.8525m

Host Name: 127.0.0.1

ProxyHost Name: pureactiv.soundprint.net

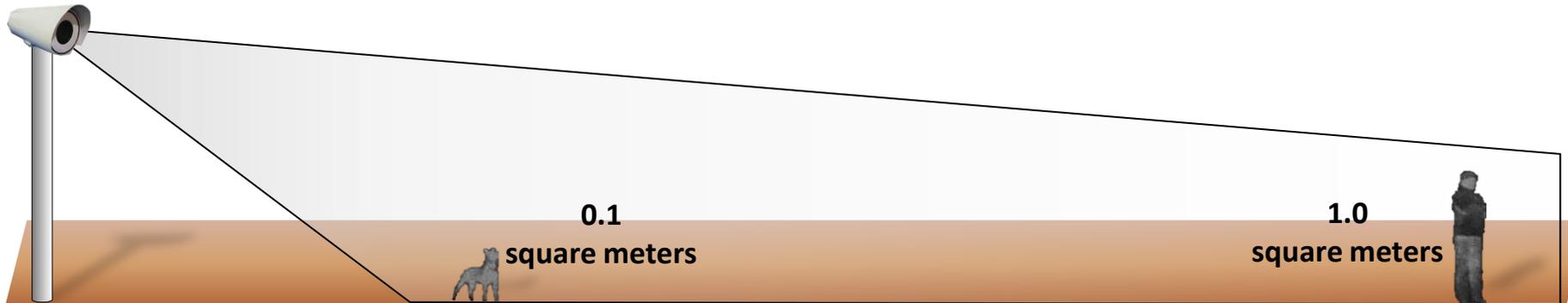
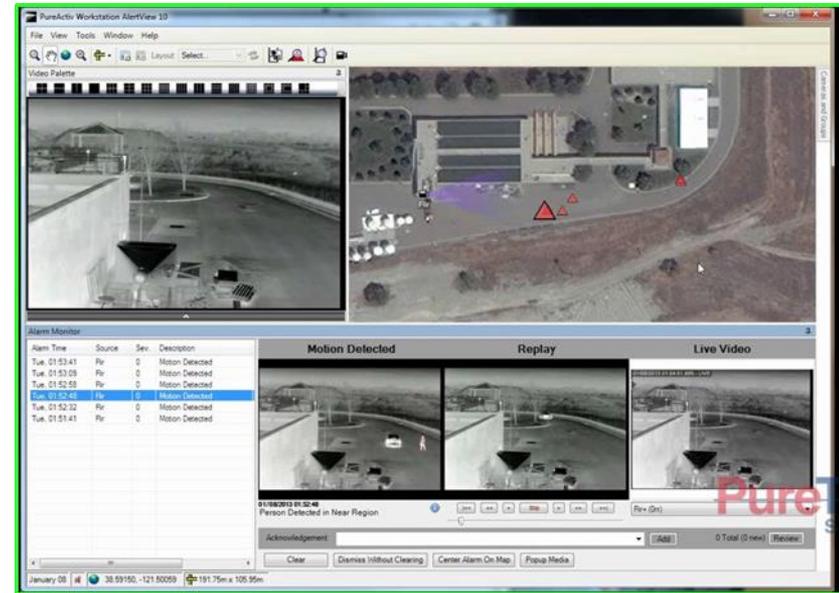
Channel Name: Street



Geospatial Security Cameras



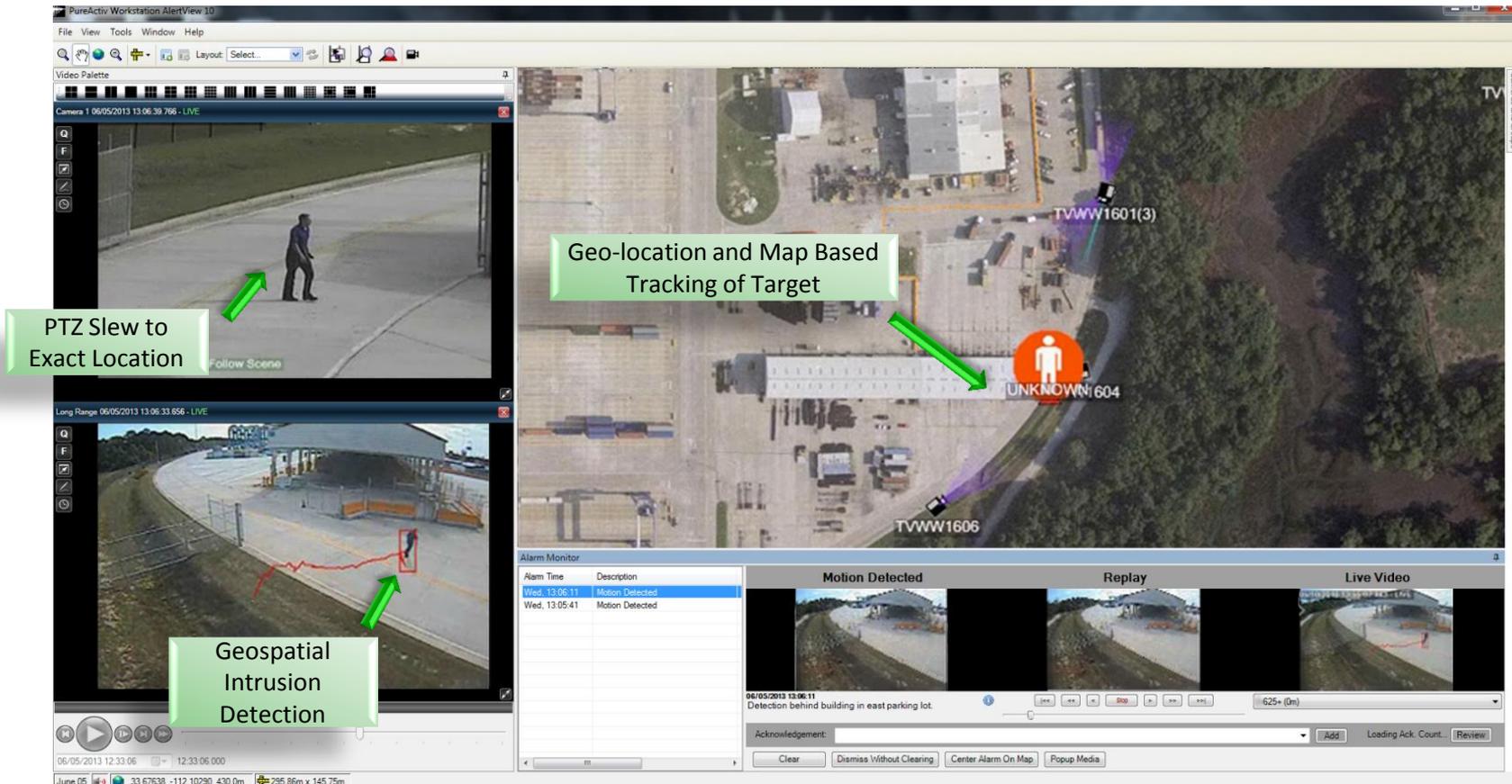
Real world location and size.



High probability of detection of humans with geo-location.

“Georeferencing” also enables PTZ cameras

- Manual Control & Automatic



The screenshot displays the PureActiv Workstation AlertView 3.0 interface, which integrates map-based control for PTZ cameras. The main map view shows an aerial view of a facility with several camera locations marked, including TVWW1601(3) and TVWW1606. A red icon labeled 'UNKNOWN: 604' is positioned on a path, with a green arrow pointing from a text box 'Geo-location and Map Based Tracking of Target' to it. A purple line indicates a camera's field of view or tracking path.

On the left, two video feeds are shown. The top feed, labeled 'Camera 1 06/05/2013 13:06:38 766 - LIVE', shows a person walking. A green arrow points from a text box 'PTZ Slew to Exact Location' to the person. The bottom feed, labeled 'Long Range 06/05/2013 13:06:33 656 - LIVE', shows a wide view of a parking lot with a red line indicating a geospatial intrusion. A green arrow points from a text box 'Geospatial Intrusion Detection' to the red line.

At the bottom, an 'Alarm Monitor' table lists detected events:

Alarm Time	Description
Wed, 13:06:11	Motion Detected
Wed, 13:05:41	Motion Detected

Below the table, a 'Motion Detected' section shows a 'Replay' and 'Live Video' view of the intrusion event. The 'Replay' view shows a sequence of frames with a red line indicating the intrusion path. The 'Live Video' view shows the current camera feed. A distance of 625m is displayed. Below the video, there are buttons for 'Clear', 'Dismiss Without Clearing', 'Center Alarm On Map', and 'PopUp Media'.

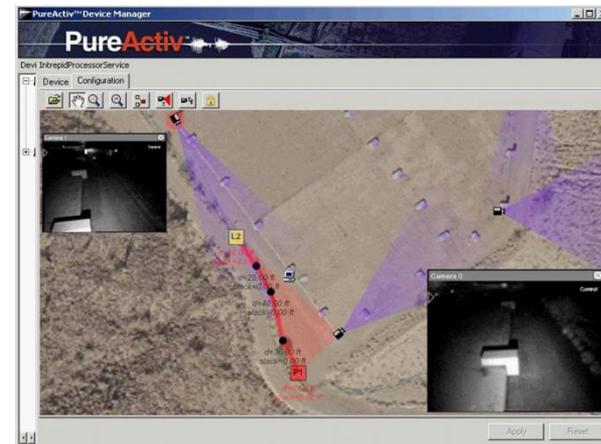


Fence Intrusion Automated Response



How do geospatial sensors play together to react to an intrusion along a fence line?

- The Smart Fence Detects the intruder
- The fence sends the alarm data to the VMS, which includes the location along fence where the event occurred.
- The geospatial VMS translates the linear location into latitude, longitude and elevation
- A geospatial PTZ camera is then automatically cued (Pan, Tilt & zoom) to exact location of intrusion
- If equipped, the PTZ can utilize Geospatial video analytics to ID the intrusion or ignore potential nuisance alarms.
- An Icon representing intruder type is displayed on map based for quick operator identification
- The PTZ Camera then automatically follows intruder until he is out of range or the operator takes manual control



Fence Intrusion Automated Response



The screenshot displays the PureActiv™ Device Manager software interface. The title bar reads "PureActiv™ Device Manager". Below the title bar, the "PureActiv™" logo is prominently displayed. The interface includes a menu bar with "Device" and "Configuration" options, and a toolbar with various icons for navigation and control.

The main display area shows an aerial view of a property with a fence line. Two cameras are positioned around the fence, each with a purple detection zone. The software displays the following parameters for the fence segments:

- Segment 1: $d=0.00\text{ ft}$, $slack=3.20\text{ ft}$
- Segment 2: $d=25.00\text{ ft}$, $slack=0.00\text{ ft}$
- Segment 3: $d=40.00\text{ ft}$, $slack=0.00\text{ ft}$
- Segment 4: $d=30.00\text{ ft}$, $slack=0.00\text{ ft}$
- Segment 5: $d=0.00\text{ ft}$, $slack=0.00\text{ ft}$

Two camera preview windows are visible: "Camera 1" (top left) and "Camera 0" (bottom right). The "Camera 0" window shows a close-up of a fence post. At the bottom of the interface, there are "Apply" and "Reset" buttons.

Slew to Radar Cue – Visual ID



Using geospatial sensors to automatically provide visual radar confirmation

- The Radar Detects a target and coordinates with camera, much like the fence example.
- Additionally, the radar can continue to update the camera as the target moves.
- Targets can be tracked by manually selecting a target from map



Slew to Radar



Map Based Target Selection

Slew to Access Control, RFID, Proximity Sensor

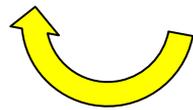


Even “pseudo” geospatial sensors can be responded to automatically

- Intelligent Zoom - A geospatial system can intelligently adjust the zoom based on the targets real location in relationship to the cameras real location. (5 Km to 100 m)



100m

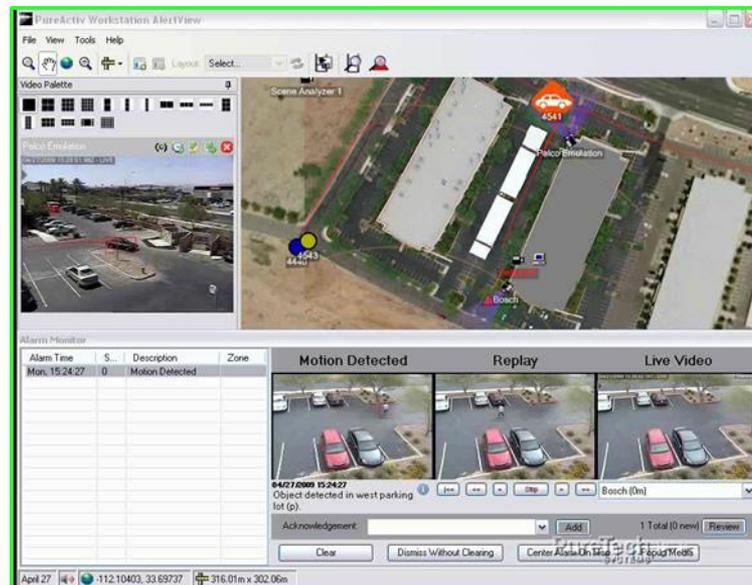


5 Km

A screenshot of the PureActiv Workstation AlertView 10 software interface. The interface is divided into several panels. On the left is a large video pane showing a wide-angle, grayscale camera view of a landscape with a road and trees. Above this pane is a 'Video Palette' and a 'Control' button. To the right of the video pane is an 'Alarm Monitor' table with columns for 'Alarm Time', 'Source', 'Description', and 'Status'. Below the table are three video thumbnails labeled 'Motion Detected', 'Replay', and 'Live Video'. At the bottom of the interface is a map showing a satellite view of the area, with a green line indicating a path or boundary. The status bar at the very bottom shows the date 'May 16' and various system metrics.

What happens when a single target creates multiple targets - Radar, GPS, Video?

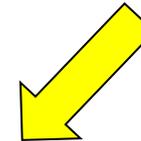
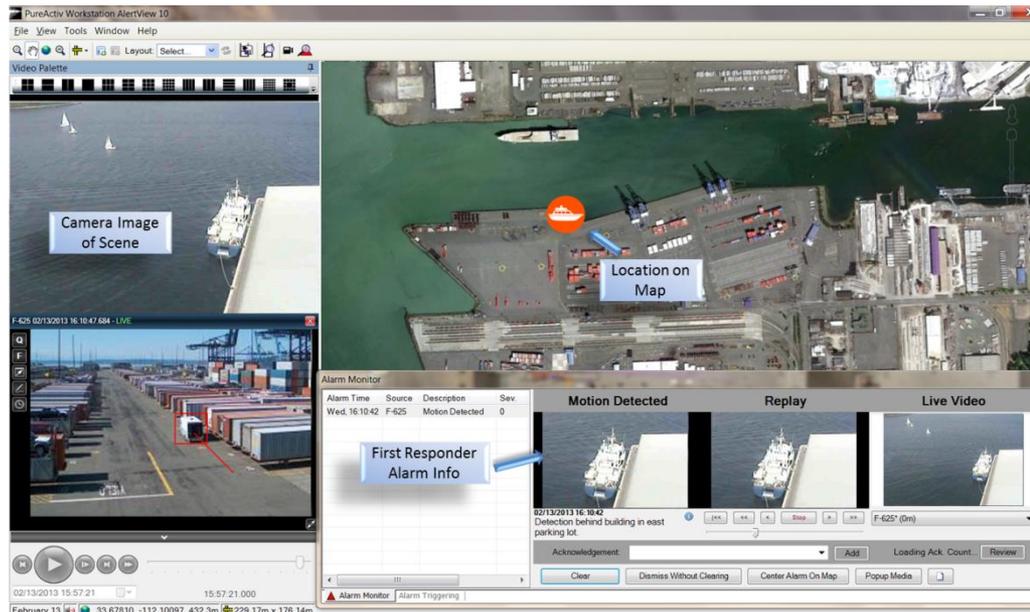
- “Friends” have GPS
- A Geospatial VMS compares location, determines that the targets are a single target and represent a “friend”.
- This data can be remembered while track persists.



First Responder Alarm



- First Responder Captures Smart Phone Image
- Smart Phone App sends the alarm info, including lat/long/elev to VMS
- First Responder Action Appears as an Alarm
- Location appears on map, Can steer directly to incident.



First Responder Alarm



PureActiv Workstation AlertView 10

File View Tools Window Help

Video Palette

Camera Image of Scene

Location on Map

Alarm Monitor

Alarm Time	Source	Description	Sev.
Wed. 16:10:42	F-625	Motion Detected	0

First Responder Alarm Info

Motion Detected

Replay

Live Video

02/13/2013 16:10:42
Detection behind building in east parking lot.

Acknowledgement: [Dropdown] [Add] Loading Ack. Count... [Review]

Clear Dismiss Without Clearing Center Alarm On Map Popup Media

02/13/2013 15:57:21 15:57:21.000

February 13 33.67810, -112.10097, 432.3m 229.17m x 176.14m

Track Properties
Cameras and Groups
Alarm Cameras

Alarm Management & Forensic Search



- Each Alarm includes location information

The screenshot shows the "Alarm Search" application window. It has a search bar at the top left and two tabs: "F-625: Image" and "F-625: Video". The "Image" tab is active, showing a satellite map on the left with a red triangle indicating the alarm location, and a video frame on the right showing a person walking in a parking lot, highlighted with a red box. To the right of the video is an "Info" panel with the following details:

- Date:** 02/15/2013 16:40:21
- ACKs:** 0
- Type:** Motion Detected Cleared
- Desc:** Detection behind building in east parking lot.
- Alarm Source:**
 - Site: PureActiv
 - DAQ: PureTechSales
 - Device: F-625
 - Location: Lat: 33.67719°N, Lon: 112.10205°W

Below the video and info panels is a table with the following columns: Image, Alarm Date (Local), Type, and Device.

Image	Alarm Date (Local)	Type	Device
	02/15/2013 16:42:41	Motion Detected	F-625

At the bottom left, there are search filters for "From:" (02/15/2013 15:51:41) and "To:" (02/15/2013 16:51:41), along with "Load" and "Clear Results" buttons.

- Alarms can be searched by “Area of Map”

The screenshot shows the "Region Definition" application window. It features a satellite map of an industrial area with a yellow polygon labeled "Search Region" and a red rectangle labeled "Ignore Region". At the bottom of the window are four buttons: "Search Region", "Ignore Region", "Clear", and "Save".

Map Based Scenario Replay



- “GUI” Replay of Event
- What operator was seeing, sensor positions, map locations
- Data Review– Who was controlling sensor, detailed target info

The screenshot displays the PureActiv Workstation AlertView 10 interface. The main window is divided into several sections:

- Top Left:** A video palette showing a grid of camera feeds. Below it, a large video window displays a live feed of a white van, with a red box highlighting the vehicle and a red line connecting it to the map.
- Center:** A satellite map view of an industrial area with various buildings and a parking lot. Several orange icons (representing ships, a car, and a person) are overlaid on the map, with red lines indicating their positions and movement paths.
- Bottom Left:** An "Alarm Monitor" table with columns for Alarm Time, Source, Description, and Sev. The table contains one entry: "Wed, 16:10:42 F-625 Motion Detected 0".
- Bottom Center:** A "Replay" section with three video thumbnails labeled "Motion Detected", "Replay", and "Live Video". Below the thumbnails are playback controls (play, stop, etc.) and a dropdown menu showing "F-625* (0m)".
- Bottom Right:** A "Live Video" section with a video window showing a live feed of the white van. Below the video are buttons for "Clear", "Dismiss Without Clearing", "Center Alarm On Map", and "Popup Media".

The interface also includes a menu bar (File, View, Tools, Window, Help), a toolbar, and a status bar at the bottom showing the date and time (February 13, 15:57:21.000) and coordinates (33.67810, -112.10097, 432.3m).

- Seaports have some tough security problems
 - Land Side, Water Side
 - Vast Perimeters
 - Many moving assets
 - Variety of Security Sensors
- Need to quickly gain perspective of event
- Need to communicate the event to others and react efficiently
- Ability to review new events or research past events
- Integrating Geospatial Sensors is an effective means to meet these needs



Question?

Geospatially Integrated Surveillance Systems

Kevin Campbell

Vice President Sales

Kevin.Campbell@PureTechSystems.com

O: 602-424-9842 x118

www.puretechsystems.com

Detect – Analyze – Respond