

Automating Wide Area Surveillance with Radar, AIS, and GPS

Dan Flynn
Honeywell Aerospace
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Agenda

- Typical System Architecture
 - Detection Sensors
 - Automation
 - System Responses
- Impact on IT Organization
 - Network Impact
 - Training
 - Maintenance

Typical System Architecture

Sensors



Marine Radar



AIS



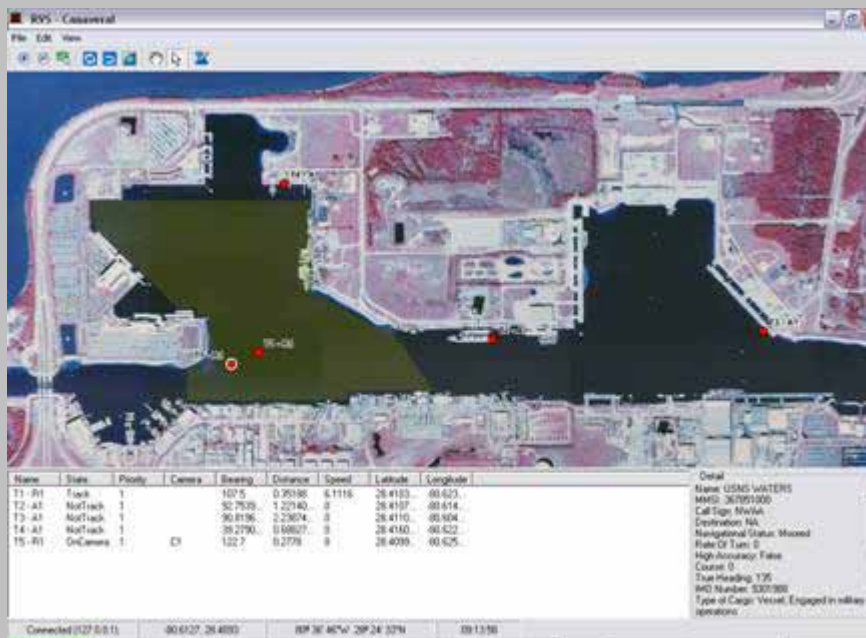
Ground Radar



GPS

Detect

Situational Awareness Processor



Track, Display, Prioritize

Security Systems



Respond

Video Analytics vs. Radar Detection



- 24 cameras for detection
- Partial coverage
- Several Cameras to Identify
- Extensive set up, tuning
- Daylight operation only
- Highly susceptible to weather
- \$450K + \$60K Maintenance

- 1 radar for detection
- Full coverage
- Several Cameras to Identify
- Less set up, maintenance
- 24 hour detection
- Less susceptible to weather
- \$250K + \$20K Maintenance

Waterside Sensors



- Radar
 - 4kW to 25kW
 - 4' to 9' Antenna
 - < 1 mbps Bandwidth
 - 25° Vertical Beamwidth
 - Effective Range 1 - 6 NM



- AIS
 - Required for 65' + Commercial Vessels
 - Filters Commercial Activity from Radar Returns
 - < 1kbps Bandwidth
 - Effective Range 15 – 40 NM

Typical Waterside Sensor Enclosure



- NEMA 4X, 30"x24"x8"
- Converts Radar, AIS Data to TCP/IP
- 15 – 30 Min UPS
- IP Power Switch
- CCTV Streamer
- IP Addresses Required for Radar, AIS, CCTV, Power Switch
- Estimate 1 mbps + CCTV

Radar Mounting Options



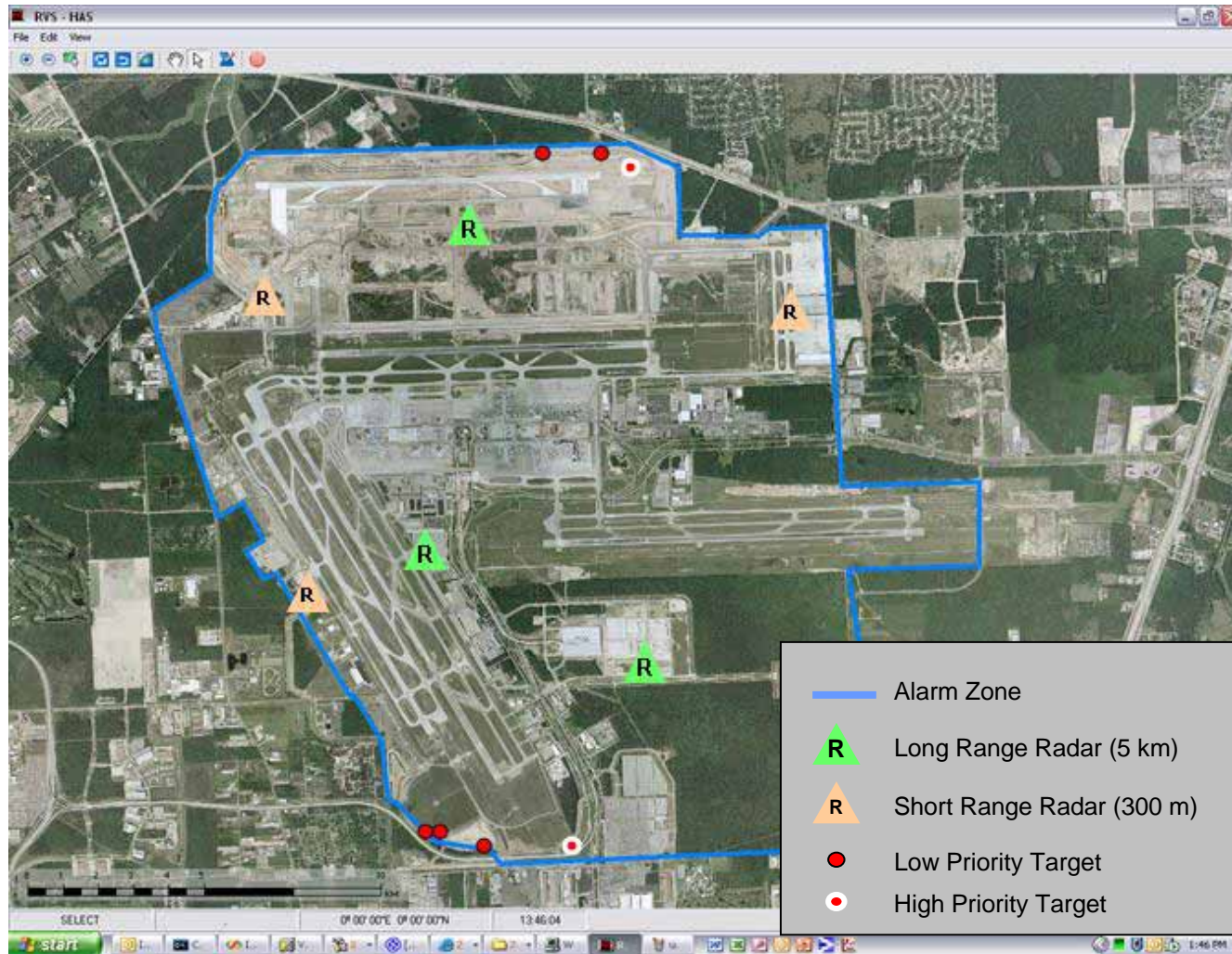
Ground Sensors



- Radar
 - 300m, 1400m, 12 km Ranges
 - < 1mbps Raw Data
 - XML to SA Processor
 - Expensive But Can be Cost Effective on the Right Terrain
- GPS
 - 900 mHz, Cellular, or Satellite
 - 900 mHz approx. 3 mi Range
 - Vehicle Mounted or Personnel Carried



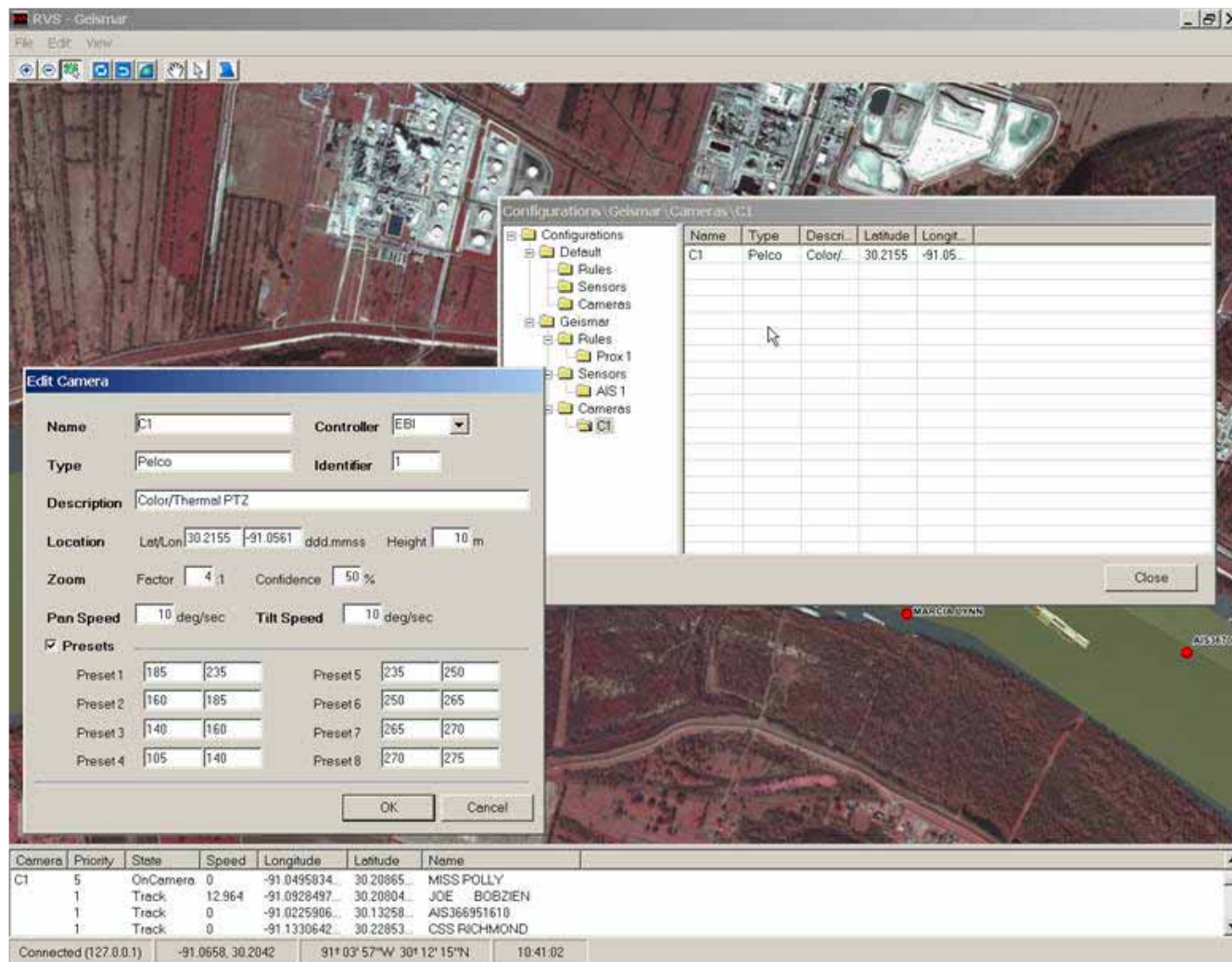
Example Ground Sensor Layout



Automation – Typical Features

- Multiple Sensor Inputs
- Distributed Operation
- Data Fusion
- GIS Mapping
- User Defined Alarm Zones
- AIS Filtering
- GPS Filtering
- User Defined Rules
- Threat Prioritization
- MARSEC Levels
- Operator Alarms
- Distributed Operation
- Manual Control
- Camera Compatibility
- Look Here Now

Edit Camera Configuration



Edit Sensor Configuration

The screenshot shows the RVS - Geismar software interface. The main window displays a satellite map of a coastal area. Overlaid on the map are two windows:

- Edit Sensor Dialog:** This window is used to configure the 'AIS 1' sensor. It contains the following fields:
 - Name:** AIS 1
 - Description:** AIS receiver at dock
 - Type:** AIS (selected from a dropdown)
 - Location:** Lat/Lon: 0 0 ddd.mmmss
 - Serial:** ☐ Serial (disabled), COM1 (selected from dropdown), 18302 (selected from dropdown)
 - Socket:** ☒ Socket, Host: localhost, Port: 10030
- Configurations - Geismar - Sensors - AIS 1:** This window shows a tree view of the configuration hierarchy. The 'AIS 1' sensor is selected. The table below shows the configuration details for the selected sensor.

Sensor Configuration Table:

Name	Type	Descri.	Latitude	Longitude
AIS 1	AIS	AIS re...	0	0

Map Data Table:

Camera	Priority	State	Speed	Longitude	Latitude	Name
C1	5	OnCamera	3.704	-91.0497283...	30.20873...	MISS POLLY
	1	Track	12.964	-91.0946502...	30.20738...	JOE BOBZIEN
	1	Track	0	-91.0225906...	30.13258...	AIS366951610
	1	Track	0	-91.1330871	30.22853...	CSS RICHMOND

Connection Status:

Connected (127.0.0.1)	Latitude	Longitude	Time
-91.0626, 30.2034	91° 03' 45" W	30° 12' 12" N	10:40:29

Edit Rules

The screenshot shows the RVS - Geismar software interface. The main window displays a satellite map of a coastal area. Overlaid on the map are two windows:

- Edit Rule Dialog Box:** This dialog is used to configure a rule. It contains the following fields:
 - Name:** Prox 1
 - Priority:** 5
 - Description:** Within 2km
 - Speed:** Low () km/h, High () km/h
 - Proximity:** Lat 30.2155 ddd mmss, Lon -91.0561 ddd mmss. Min 0.25 km, Max 2 km.
 - Time Of Day:** From () To ()
 - Day of Week:** Monday
 - Bearing:** From () To ()
 - AIS:** ()
- Configurations\Geismar\Rules\Prox 1 Table:** This table lists the rules. It has columns for Descri, Name, and Priority. The first row shows 'Within', 'Prox 1', and '5'. There is a 'Close' button at the bottom right of this window.

At the bottom of the main window, there is a table showing the status of various cameras and their associated data:

Camera	Priority	State	Speed	Longitude	Latitude	Name
C1	5	OnCamera	14.816	-91.0518035	30.20975	MISS POLLY
	1	Track	12.964	-91.0960311	30.20685	JOE BOBZIEN
	1	Track	0	-91.0225906	30.13258	AIS366951610
	1	Track	0	-91.1330871	30.22854	CSS RICHMOND

At the very bottom, there is a status bar showing connection information: Connected (127.0.0.1), -91.0699, 30.2215, 91° 04' 12"W 30° 13' 18"N, 10:39:47.

System Responses

- Alarm Annunciation
 - Security Platform API
 - XML Interface
 - SQL Server Interface
 - Feedback to SA Screen
 - TCP/IP Controlled Dry Contact Switches
- CCTV Response
 - Multiple Cameras
 - Preset Controlled
 - Closest Camera With View Selected
 - Recording Initiated on Alarm

Impact on IT Organization

- Impact on Network
 - IP Addresses Required for Radar, AIS, CCTV, Remote Power
 - < 1mbps for Waterside Sensor Pack
 - < 1mbps for Ground Radar
- Training
 - One week training program at supplier facility
 - On site training during installation and sell-off
- Maintenance
 - Trained System Administrator Maintains Rules and Responses
 - Typically the Same Person Maintaining Access & CCTV Systems
 - Physical Maintenance Similar in Scope to Maintaining a Camera – Quarterly Cleaning and Inspection

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Thank You