

# Automating Wide Area Surveillance with Radar and Video

Sep 22, 2011

Honeywell ACS

Critical Infrastructure Protection

**Honeywell**

## Radar Video Surveillance (RVS)

### Sensors



Marine Radar



AIS



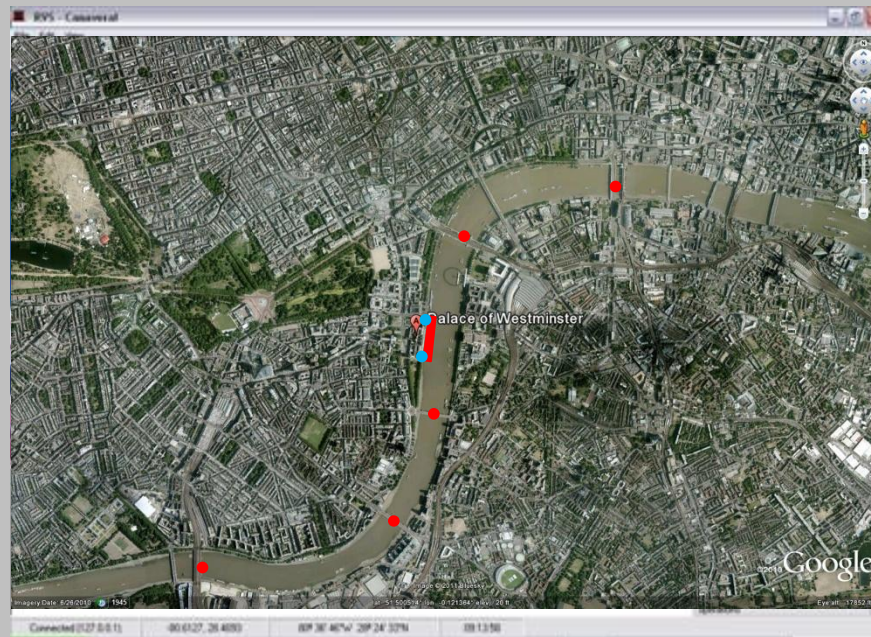
Ground Radar



GPS

**Detect**

### Situational Awareness Processor



**Track, Display, Prioritize**

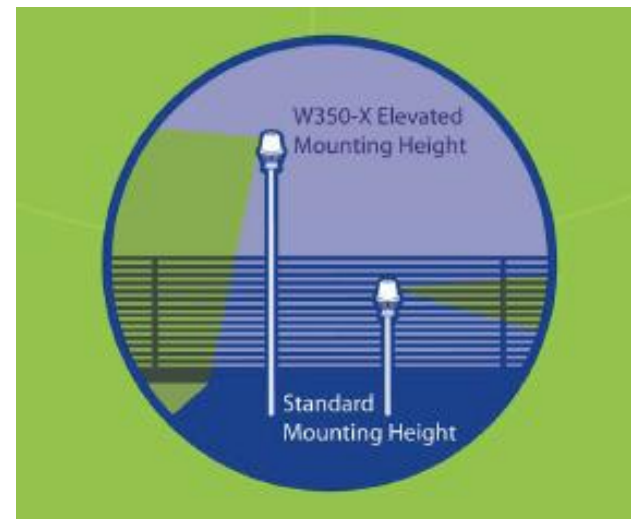
### Security Systems



**Respond**

## Evolution of Perimeter Monitoring Technology

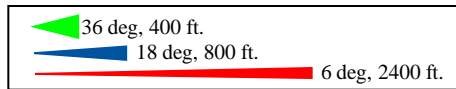
- Fence Sensors (coax, fiber)
- Underground Sensors
- Microwave Sensors
- Color Video Analytics with PTZ Response
- Thermal Video Analytics with PTZ Response
- Radar Sensors with PTZ Response
  - » Radar designs for fence or interior mounting
  - » Fence radar monitors both sides of fence, or interior radar monitors multiple KM of perimeter
  - » Radar tracks intruders outside and inside the facility, not just at the fence line
  - » Radars can be combined with other sensors such as FFT



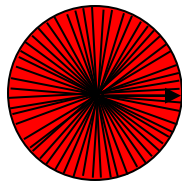
## Object Detection – CCTV vs. Radar

Variables	
Horizontal Pixels	640
Min Feet/Pixel	2

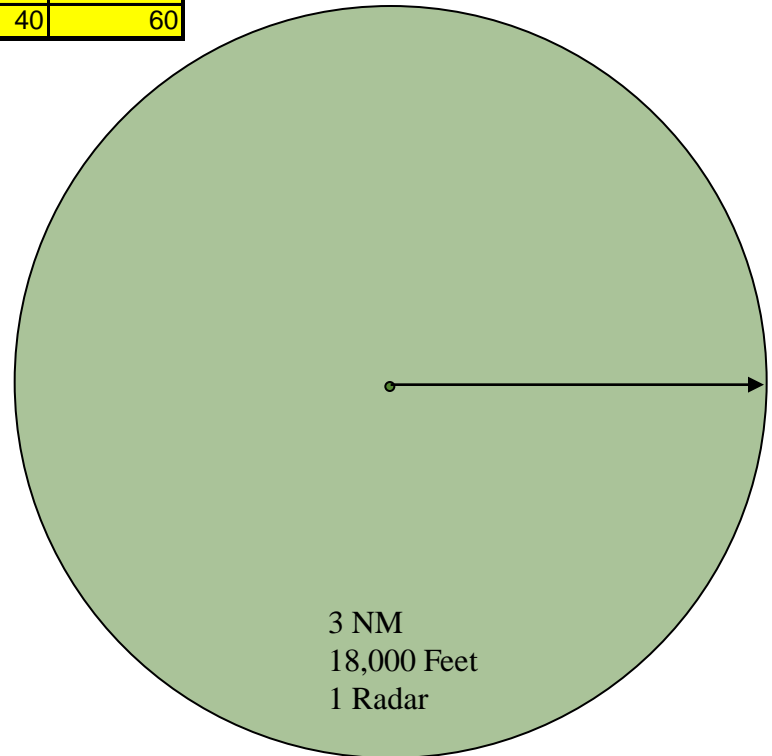
Performance Calculations						
FOV (deg)	49	36	18	12	9	6
Range (ft)	351	492	1010	1522	2033	3053
Design Range (ft)	281	394	808	1218	1626	2442
Cameras Req. for 360	8	10	20	30	40	60



400 Feet  
10 Short Range Cameras



2400 Feet  
60 Long Range Cameras



## 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

## Radar Mounting Options



## Ground Sensors



- Radar
  - 350m to 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

## Other RVS Projects

Location	Customer	System Type	Radars
Port Canaveral, FL	Canaveral Port Authority	Seaport Surveillance	2
Geismar, LA	Honeywell Specialty Materials	Chemical Plant Surveillance	1
Lake Maracaibo, VE	PDVSA	Oil Well Surveillance	1
Freeport, TX	Dow Chemical	Chemical Plant Surveillance	1
San Juan, PR	Puerto Rico Ports Authority	Seaport Surveillance	1
<b>Houston, TX</b>	<b>Bush Intercontinental Airport</b>	<b>Airport PIDS</b>	<b>5</b>
<b>Houston, TX</b>	<b>Houston Hobby Airport</b>	<b>Airport PIDS</b>	<b>1</b>
Pune, India	Reliance Industries	Offshore Platform Surveillance	2
Miami, FL	Port of Miami	Seaport Surveillance	5
KSC, FL	NASA Kennedy Space Center	Shoreline Intrusion Detection	2
Luanda, Angola	Angola LNG	Shoreline Intrusion Detection	2
<b>Perth, AUS</b>	<b>Perth Airport (5)</b>	<b>Airport Surveillance</b>	<b>5</b>
Brussels, Belgium	Electrabel	Nuclear Power Plant	7
Corpus Christ, TX	Port of Corpus Christi	Seaport Surveillance	2
Pasadena, TX	Pasadena Refining	Oil Refinery Surveillance	1
Grand Coulee, WA	Grand Coulee Dam	Dam Protection	1



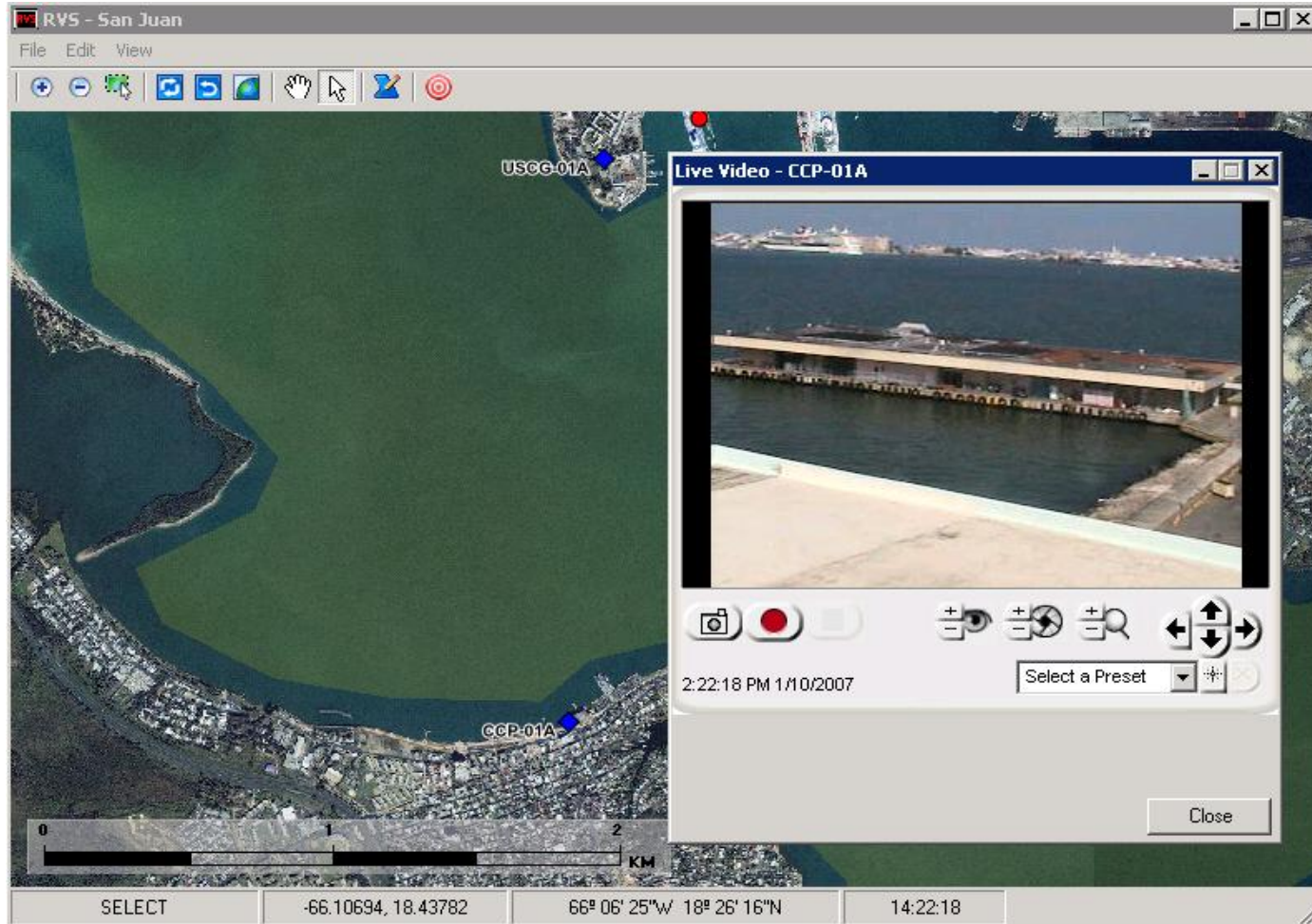
## Comparison to Other Systems

Customer Needs/Benefits	Honeywell RVS	Ciber / ObsTek	Tideland	Lockheed MIDAS	SSR	ICX	Barco	L3	Radar Digital
<b>Support Both Marine and Ground Radar</b>	X								
GPS Sensors	X	X							
GPS Filtering	X	X							
User Defined Rules	X		X	X					
User Configurations	X								
Target Prioritization	X		X			X			
<b>GIS Mapping</b>	<b>X</b>								
Red Force Blue Force	X	X							
<b>Look Here</b>	<b>X</b>								
Camera Pointing (Preset)	X		X		X	X			X
Camera Pointing (Absolute)	X		X		X	X			X
<b>Security Platform</b>	<b>X</b>								

## System Software 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
- Manual Control
- Camera Compatibility
- Look Here Now

## Look Here



## System Operation – Configure New Rule

Configurations\Default\Rules

- Configurations
  - Default
    - Rules
    - Sensors
    - Responses
  - Geismar
  - HAS Hobby
  - Canaveral

**New Rule**

General | Movement | Date/Time | Location | AIS Filter

Name:  Priority:

Description:

OK Cancel

Close

Enter a name for the rule  
(50 chars)

Enter a brief description  
(100 chars)

Select a priority

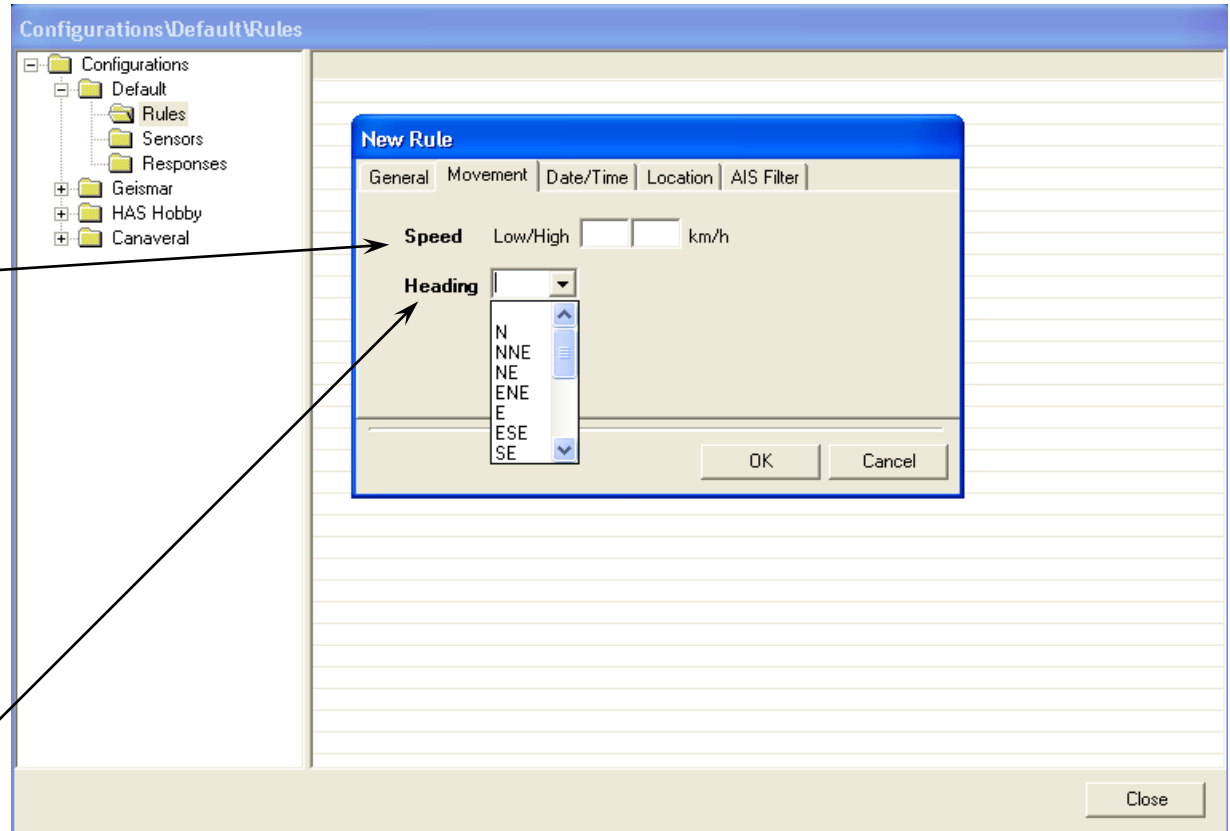
*Each rule can be based on settings from one of the settings tabs or it can be a composite of the settings tabs.*

## Rule Definition – Speed & Heading

**Speed** – Enter the Min & Max using the following criteria:

- If both Min & Max = 0 then the rule applies when a target is stopped
- If Max = 0 and Min is > 0 then the rule applies when the target is slower than Min
- If Min = 0 and Max > 0 then the rule applies when the target is faster than Max
- If Min > 0 & Max > 0 then the rule applies when the target speed is within the range

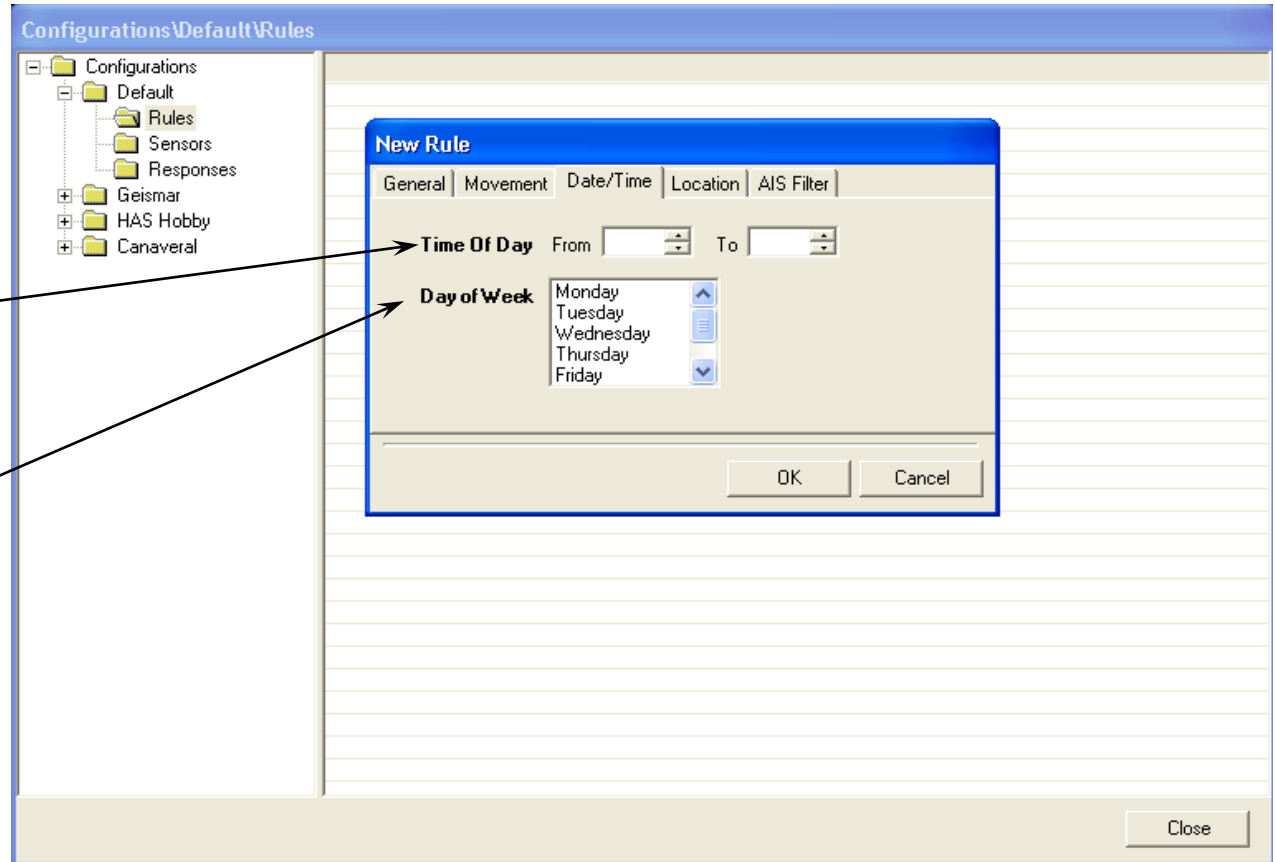
**Heading** – Select a heading to apply the rule to if the targets heading matches



## Rule Definition – Day & Time

**Time Of Day – Select a starting time & an ending time for the rule, the rule will apply for targets tracked during these times.**

**Day of Week – Select days of the week for the this rule.**



## Rule Definition – Proximity to Critical Asset

**Proximity** – Enter a location and a distance. If Max = 0 then rule applies to targets > than Min distance.

**Bearing** – Enter a range of bearings that the rule will apply when the targets bearing is within that range relative to the sensor.

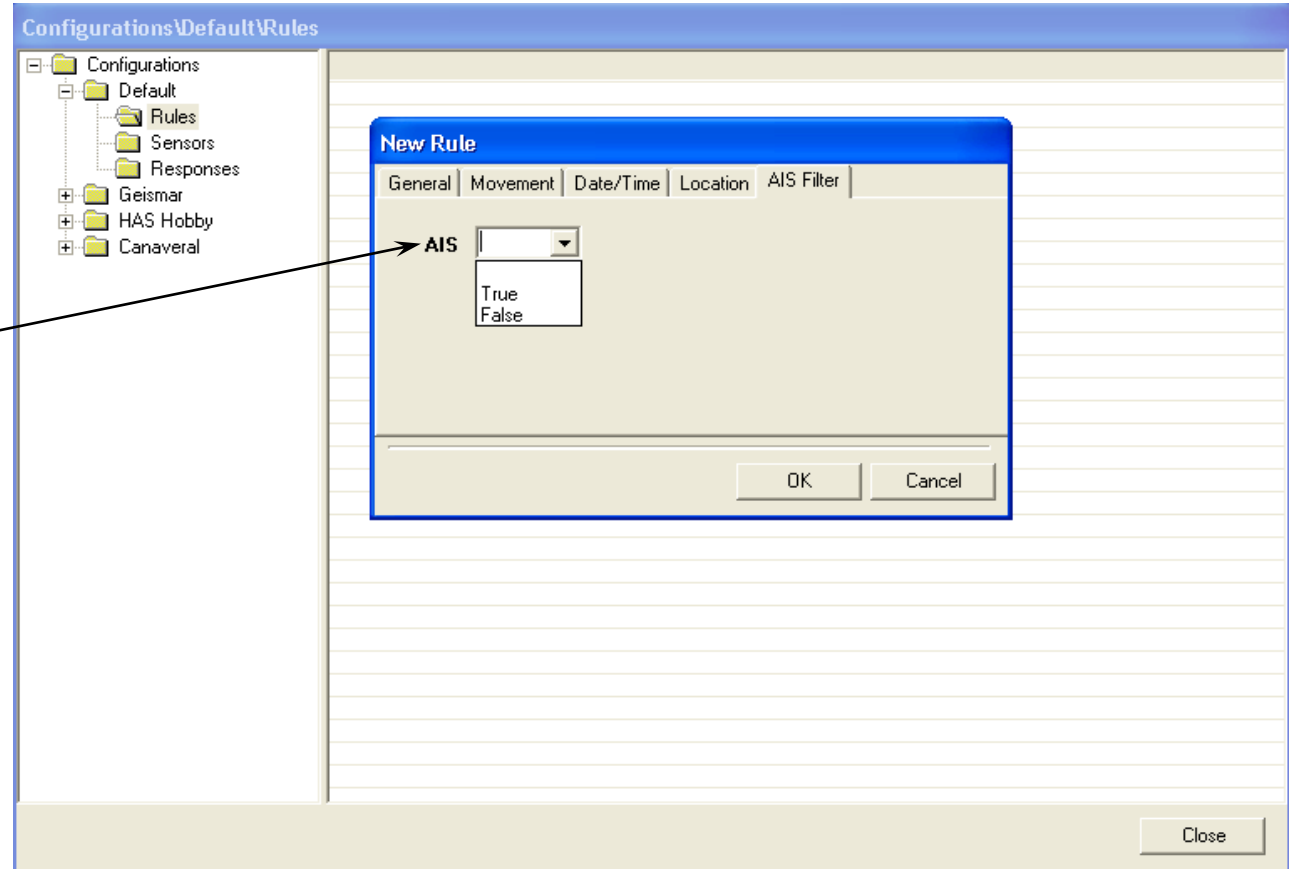
The screenshot shows a configuration window titled "Configurations\Default\Rules". On the left is a tree view with folders: Configurations, Default, Rules, Sensors, Responses, Geismar, HAS Hobby, and Canaveral. A "New Rule" dialog box is open, showing tabs for General, Movement, Date/Time, Location, and AIS Filter. The "Location" tab is active, displaying two sections: "Proximity" and "Bearing".

Section	Field	Unit
Proximity	Lat/Lon	DD.dddd
	Min/Max	km
Bearing	From/To	degrees

Buttons: OK, Cancel, Close

## Rule Definition – AIS/GPS Filter

**AIS – Select True so that the rule applies if the target has AIS.**



***Once all the settings for this rule have been configured click OK to save the rule.***



## System Responses

- Alarm Annunciation
  - Security Platform API
  - XML Interface
  - SQL Server Interface
  - TCP/IP Controlled Dry Contact Switches
- CCTV Response
  - Multiple Cameras
  - Preset Controlled or Absolute Pointing
  - Closest Camera With View Selected
  - Recording Initiated on Alarm
- Camera Choices
  - Total Day / Night
  - IR Illuminated
  - Thermal
  - Laser Illuminated

## MIA Screen Shot

The screenshot displays the Honeywell RVS - Miami Int. Airport software interface. The main window shows an aerial map of the airport with various camera (C1-C10) and radar (R1-R4) points. A 'Targets' table is visible in the bottom-left corner, and a 'Live Video - C1' window is open on the right side.

Targets									
Name	State	Priority	Camera	Bearing	Distance	Speed	Heading	Latitude	Longitude
T72	OnCamera	1	C1	240.12	2.08109	8.00008	271.72	25.7896	-80.31151
T70	NotTrack	0		275.87	0.77173	47.99995	123.82	25.79964	-80.30116
T71	NotTrack	0		232.86	2.20425	21.00001	270	25.78696	-80.31104

Live Video - C1  
 02/11/07 02:54:39 PM Az:220.1° El: -3.8°

RVSSVR\Administrator PAN -80.29084, 25.78045 80° 17' 27"W 25° 46' 50"N