

Delacom Detection Systems

Threat Warning System



Objective

- Install an effective system to provide security monitoring and detection for borders, pipelines and critical infrastructure.
- The system must be:
 - Proven
 - Robust
 - State of the Art
 - Survivable



Agenda

- System Elements
 - Threat Logic
 - Sensor Module
 - Sensor Network
 - Communications
 - Control Center
 - Key Features
- Support and Training
- Components



Threat Logic

- DDS “Threat Warning Logic” maximizes the interval for interdiction forces to identify and intercept potential insurgents or border penetrators.
- DDS’ unique, patent pending, core technology generates “Threat Warning”(TW) rather than “Detection, Recognition, Identification” (DRI) Logic.
 - With DRI logic, commonly used in IR security systems, the intruder will be able to progress close enough to the protected area to generate damage before they are identified



Threat Logic

Detection Process

- The system begins tracking when a 2 x2 pixel object is detected
 - (4 pixels out of 307,000)
 - DDS is able to separate system noise from object
- The system issues warnings and/or alarms based on speed and direction of the object (velocity vector)
- Interdiction Forces or Long Range Camera inspection determine nature of object



Detection Range

- The DDS Threat Warning Logic maximizes the detection range of the optical sensor
- The range will vary based on the field of view (lens and image semiconductor of the camera)
- The 6° FoV was chosen
 - Increases camera life from months to years
 - Decreases time for area scan
 - Significantly decreases cost per unit and there are 400 units in a 500km protection area.

Detection Range



FOV

Km Range

Km Range

1°

9 to 12

35 to 40

2°

4.5 to 6

18 to 20

4°

2 to 3

9 to 10

6°

1.5 to 2

6 to 7



Range Extension

- Again - An uncooled IR camera with a 6° Field of view is offered as standard due to the
 - maintenance and replacement requirements of the cooled cameras with a smaller FoV
 - Their Cost
 - With overlapping monitoring areas, a 1° FoV camera will need 30 minutes to scan 180 degrees which is unacceptable

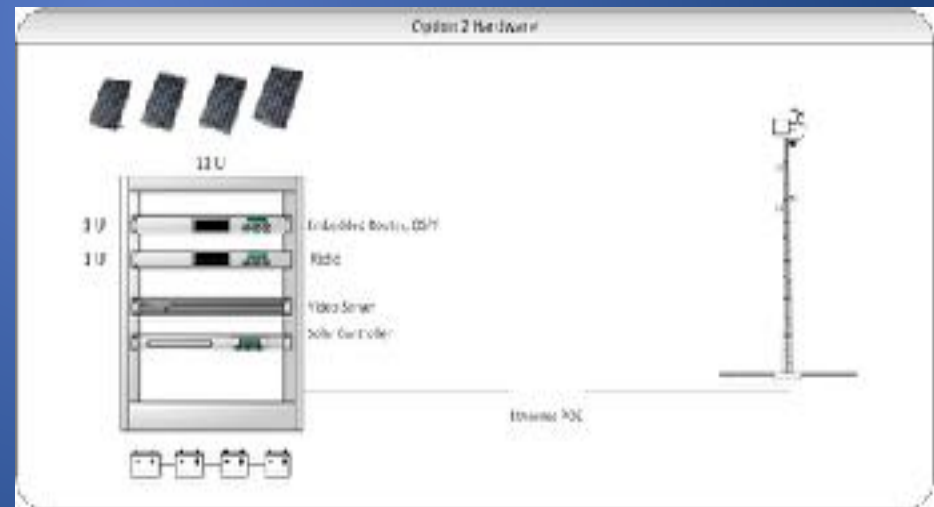


Range Extension

- With the 6° FoV cameras in place and 1° FoV cameras added at 10 Km spacing
 - Scan time of the 1° camera is not as critical
 - Lifespan can be increased by using CCTV cameras in daylight and IR extension only at night
 - Cost adder is under 15%
- **AREA MONITORED IS EXTENDED TO 12KM FOR UNMOUNTED PERSONNEL AND 35KM FOR MOUNTED**

Sensor Module

- Each Sensor site is totally self contained and not affected by the operation or failure of any other sensor site.
- It consists of
 - Optical Sensor (s)
 - Communications
 - Processor
 - Power Source



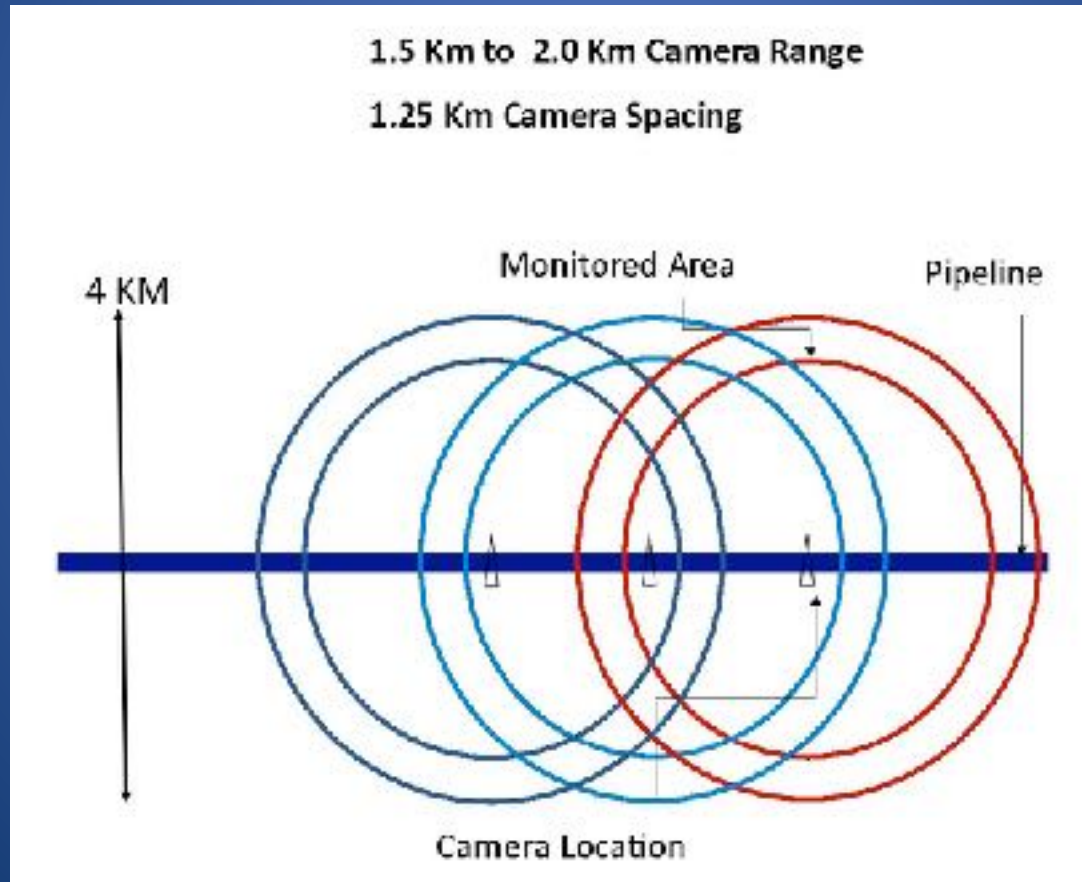


Sensor Network

- The sensor network is designed with multiple overlapping monitoring areas to:
 - Maintain maximum detection range across the monitored area
 - Minimize time any one location is not being covered by one or more sensors
 - Minimize loss of coverage in the event of a module failure

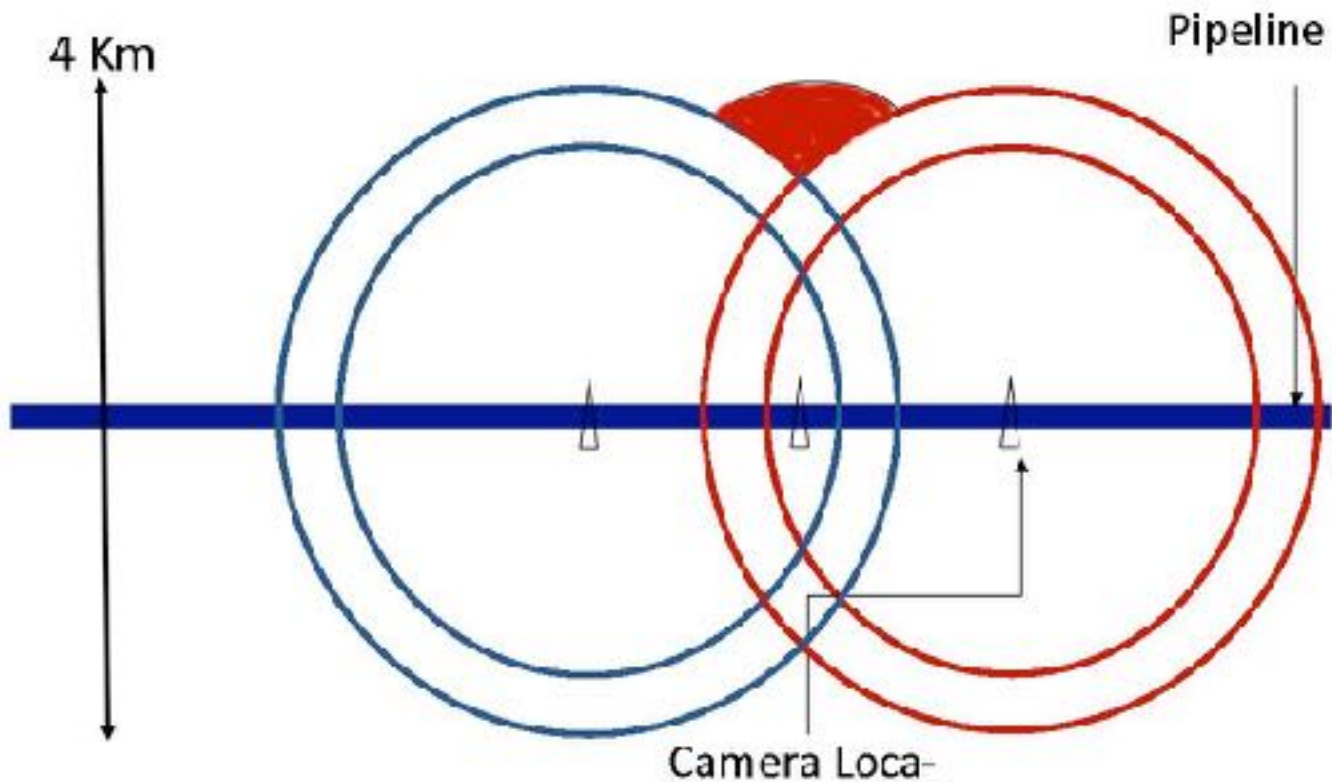
Sensor Network

Sensor Modules Spaced at 1.25 Km



Overlapping Placement

With One Module Out of Service





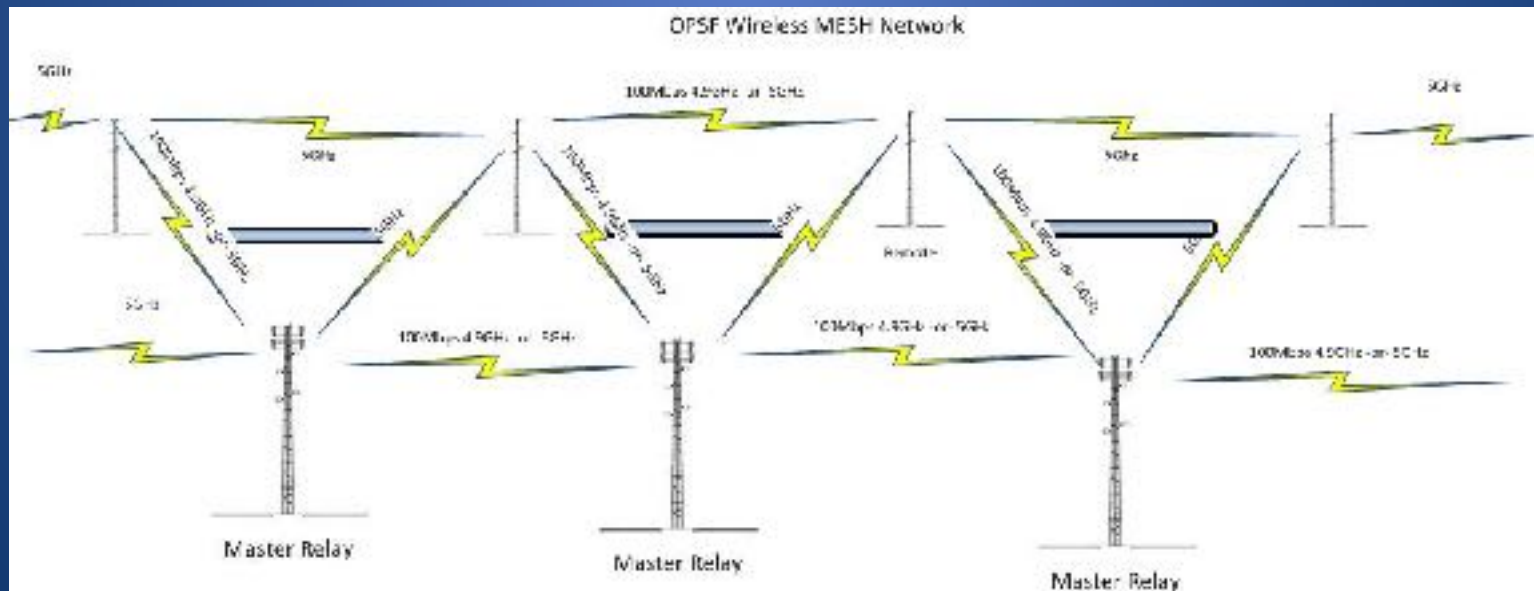
Communications Network

Routed OSPF Mesh Network (Open Path Shortest First)

- Self Healing & Self Configuring Configuration
- Every Module has a processing PC
- Multiple Frequencies to prevent hacking
- Can survive multiple module failures
- Vehicle communications and remote control available

Mesh Configuration

- Every communications node has four potential communications links to insure continuous operation in the event of multiple node failures
- System capacity is several times maximum design load





Survivability Summary

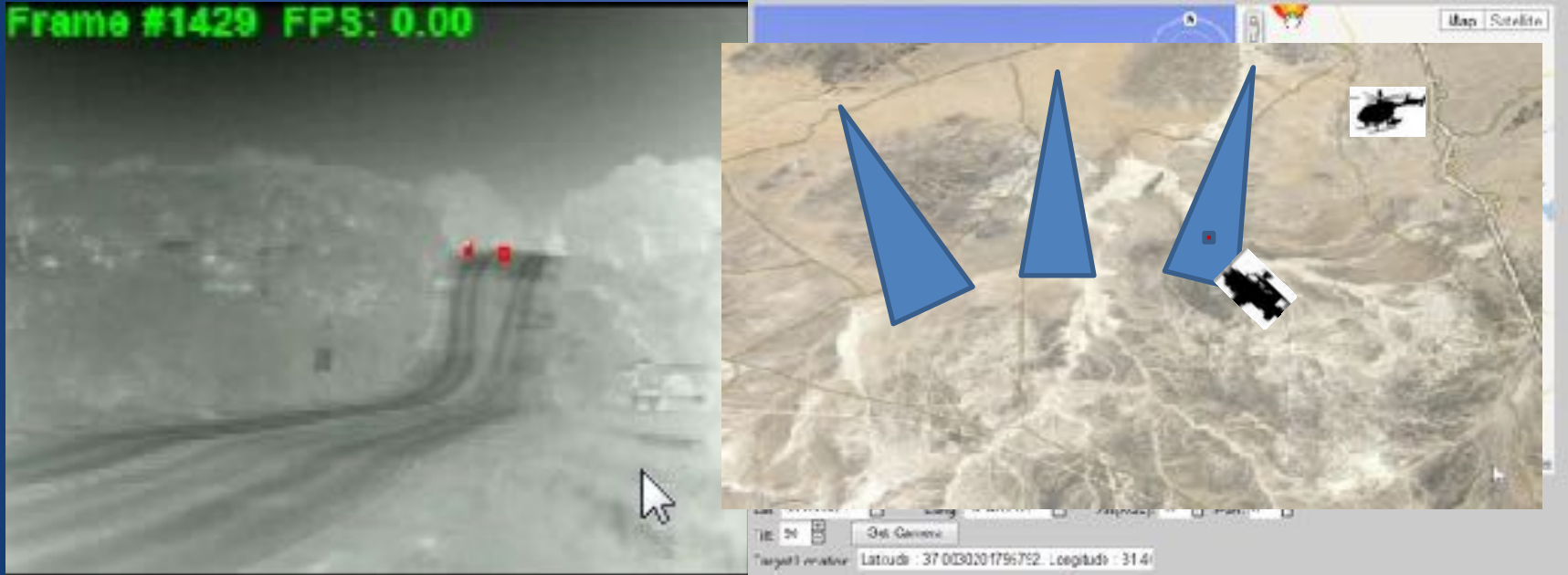
- Overlapping Areas
- Wireless
- Distributed Processing
- Redundant Communications
- Mesh Network
- Harsh Environment/High Operating Temp Components



Command and Control Center

- Features
 - Track simultaneous threats
 - Track all available assets
 - Control Remote vehicles
 - Manual Control and Zoom
 - Moving Map Display
 - GPS Coordinates
 - Smart Phone Monitoring
 - Tamper/Failure Warning
 - Record Events
 - Exclusion Areas
 - Remote Access

Command and Control Center



- Relative locations of target, ground support (remote control and manned) Airborne support (remote control and manned)
- Current coverage area of multiple sensors
- Target image return



FLIR PT-606

- FLIR's newest and most advanced uncooled IR Security Camera Dual Mounted with a Sony 36 x optical zoom CCTV
- Operating Temperature -50°C to $+70^{\circ}\text{C}$
- 360° Pan
- $\pm 90^{\circ}$ Tilt
- 125 dwell points



Components Field Computers

- Processor and Memory Specs dependent on communication options.
- - 40° C to + 85° C Operating temperature
- No Moving parts
- Conductively cooled
- Rack Mounted in Sealed Enclosure
- Atom Processor on product used in BMW Engine compartment.
 - 50,000 hour MTBF in hot, harsh environment



Components Radios

- M2M MIMO Outdoor Series
- 4 port
- 100Mbps bandwidth per port
- Integral router
- Intelligent processor IXP 435
- Conductively cooled
- Design, not selected, Mil Spec Components
- - 40° C to + 85° C Operating temperature



Components Power Supply

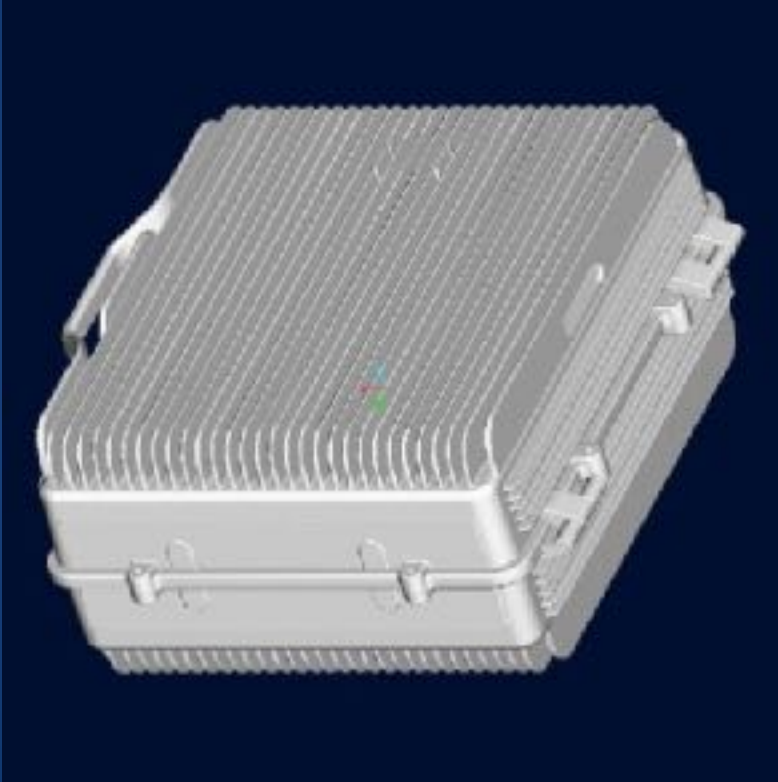
M2M Dynamics 48V/30W/50W Continuous Solar Power

- Rated Power Generation 30W-50W
- Reserve Time @ Rated Power 70hrs
- POE Output Voltage (DC) 48V
- Battery Capacity (Amp Hrs) 100Ah
- Battery Voltage 24V-48V
- Battery Life 5 Yrs
- Enclosure Type Powder Coated Steel
- Enclosure Size TBD
- Operation Temp -30°C to 60°C

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Components Enclosures

- Electronics Enclosure
 - MilSpec Sealed
 - Custom Milled for conductive cooling
 - Pole/Tower Mounted
 - Vandal Resistant





Components CCC Servers

- Redundant Servers
 - Two socket server with each socket populated by an Intel E-5 2643 (XEON) processor or better
 - 32 GB Ram
 - 512 MB video card
 - Windows Server R2008
- Two 40" Monitors
- Keyboard, Mouse and Joystick Controls



Training and Support

- 1 year warranty
- Project Engineer to remain available for 3 months after project complete
 - User Operation Training
 - Maintenance Training
 - Resolution of any start up issues
- All manuals will be issued in both English and Arabic.



Experience

- FLIR
 - The Premier Worldwide Supplier of commercial and military IR cameras
 - Produce more IR Security Cameras than all other manufacturers combined
 - Currently installed in “hundreds of locations” including LaGuardia, Dulles, Kennedy Airports, Washington Subway and Chevron



Experience

- M2M
 - 20 years experience providing leading edge communications products
 - 13 Patents
 - Operated in Kuwait, Iran, Iraq and multiple other international locations
 - Supplier to US Navy , BMW, among many others



Experience

- DDS
 - Multiple Patents Pending
 - Dr. A. Enis Cetin Chief Technical Officer
 - Inventor of Core Software
 - Recognized Expert on Video Analytics
 - Over 250 related published articles and papers
 - Member US National Science & Engineering Research Council
 - Member US National Science Foundation
 - Led research teams at the Office of Naval Research,
 - Senior member of the Turkish Academy of Sciences
 - On Site Project Manager and Technical Expert

An aerial photograph of a landscape with green fields and a blue sky. Overlaid on the image are several yellow, glowing lines that form a complex, overlapping pattern resembling a sensor grid or a network of paths. The word "Summary" is written in large, white, sans-serif font in the center of the image.

Summary

- Install a “Force Multiplication” effective system to provide security monitoring and detection of border, pipeline and critical infrastructure areas.
- The system is:
 - Proven
 - Robust
 - State of the Art
 - Survivable



Summary

- The DDS Proposal utilizes multiple components of DDS core technology to provide “Threat Warning “ rather than “Detection, Recognition, Identification” Logic
- The “team” providing hardware and software are experienced, market leading suppliers of advanced technology



Summary

- The system provides
 - Overlapping Areas
 - Wireless
 - Redundant PC's
 - Redundant Communications
 - Mesh Network
 - High Operating Temp Components
- It works
- It is Proven
- It is Survivable