Radio Physics Solutions

MiRTLE® Active MMW Standoff Threat Detection using Polarimetric Radar

ADSA14 Northeastern University

May 2016

Ed Godere, CEO

edgodere@rpssys.com

www.radiophysicssolutions.com

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Active MMW Standoff Threat Detection

Topic Area

- Standoff passenger screening using active millimeter wave threat detection

Problem

- Preventing bombs, assault weapons and hand guns from densely populated areas inside transportation centers

Solution

- MiRTLE® (millimeter wave radar threat level evaluation) detects threats hidden under a persons clothing out to a distance of 30 to 40 meters

So what

- Brussels Airport…….

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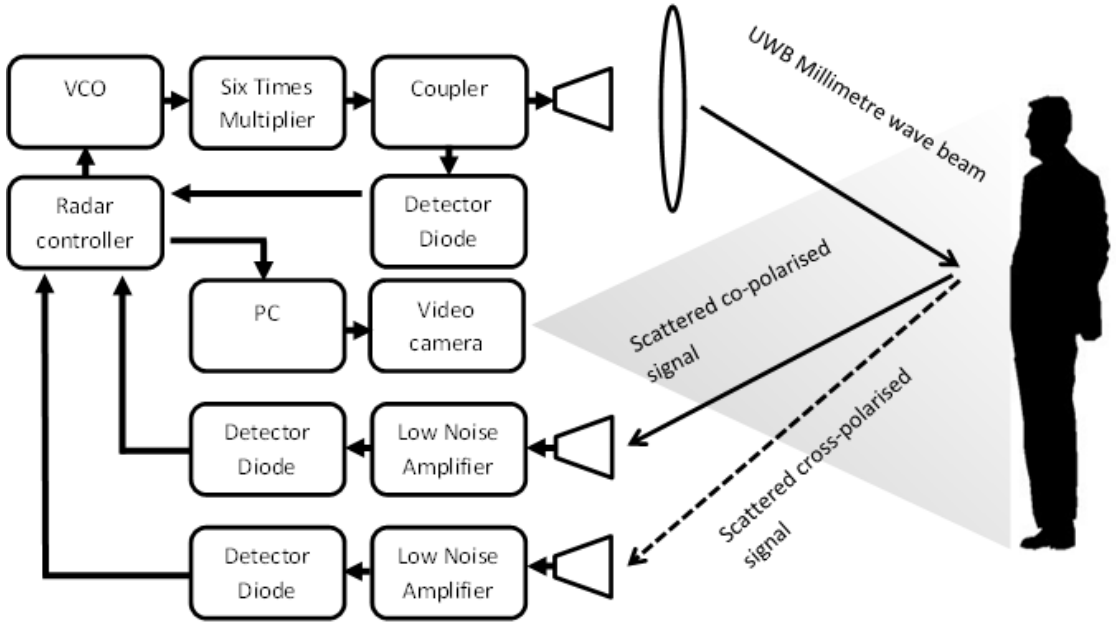
MiRTLE® Block Diagram



Microwave power at 12 – 18 GHz is multiplied up to provide UWB transmission of millimeter-wave power over the entire W-band. A GOLA provides a highly directive beam (up to 45 dBi) to illuminate the target person. Orthogonally polarized receivers provide two channels of target depth information which is processed autonomously to render a real time threat/no threat decision

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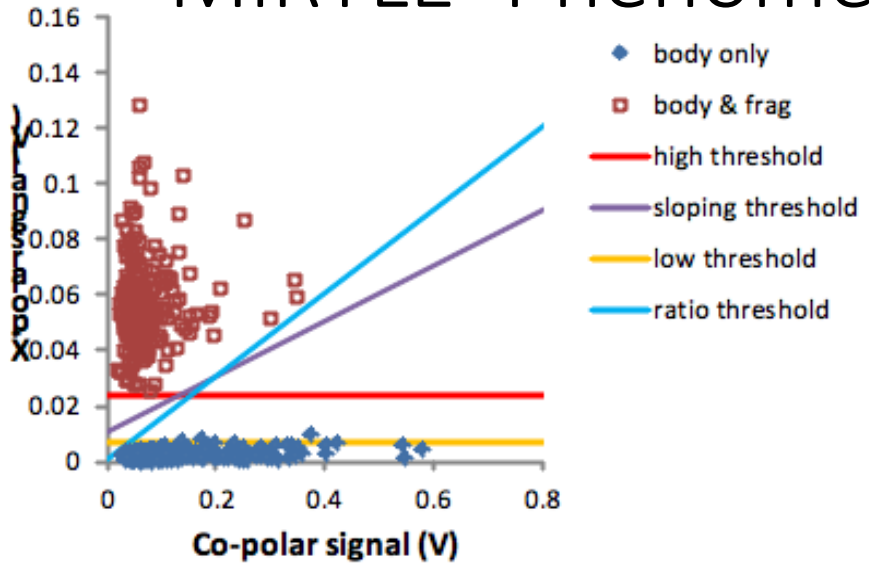
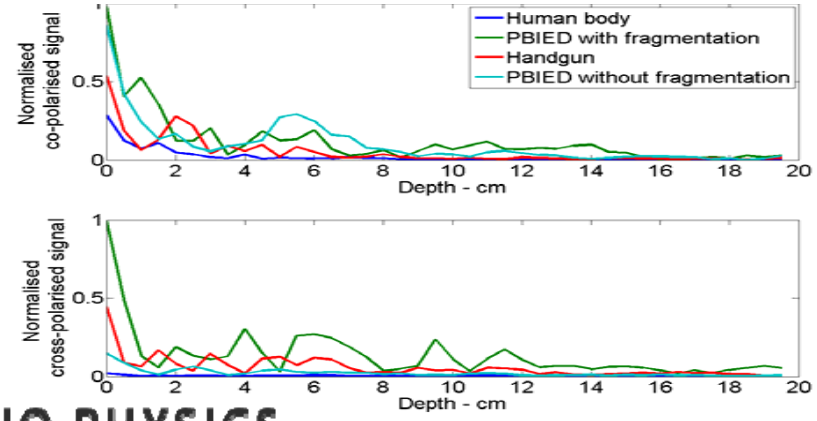
MiRTLE® Phenomenology





Detection and discrimination of objects concealed under clothing is possible because typical clothing does not attenuate much at millimeter-wave frequencies. Using pattern recognition software to analyze the change in polarization and depth information of the target, which is encoded in the scattered waveform, it is possible to determine the nature or class of object concealed. As examples, the top left figure shows the clustering of radar return amplitude for a body with (RED) and without (BLUE) a PBIED. Additional depth information is presented due to the UWB nature of the system. The bottom left figure shows the two receiver channel depth spectra for a variety of situations

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MiRTLE® Active MMW Standoff Threat Detection

MiRTLE® 10

- Hand-held, tripod or fixed
- 10 meter standoff detection
- 90% detection of guns to 10m
- 70% detection of knifes to 10m
- 5-6% faults alarm rate (large zippers, belt buckles)
- Operator separation: 10-110 meters
- Power 2 mw average
- Battery life: 4 hours plus
- Weight: 8.5 pounds
- No setup required (on-off switch)
- High reliability (no moving parts)
- Emission 25 X lower than MPE limits

MiRTLE® 30

- Tripod or fixed
- 30 meter standoff detection
- 97% Detection of PBIED's to 30m
- 75% Detection of pipe bombs to 30m
- 70% detection of large assault weapons
- 5-6% faults alarm rate (large zippers, belt buckles)
- Operator separation 30-130 meters
- Power 2 mw average
- Battery life 8 hours plus
- Sensor weight 16.5 pounds
- Setup time 10 minutes of less
- High sensor reliability (no moving parts)
- Emissions 25 X lower than MPE limits

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MiRTLE® Standoff Threat Detection Applications

MiRTLE® Security Screening

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MiRTLE® Checkpoint Standoff Screening

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MiRTLE® Secondary Screening

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MiRTLE® Remote Standoff Screening

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