

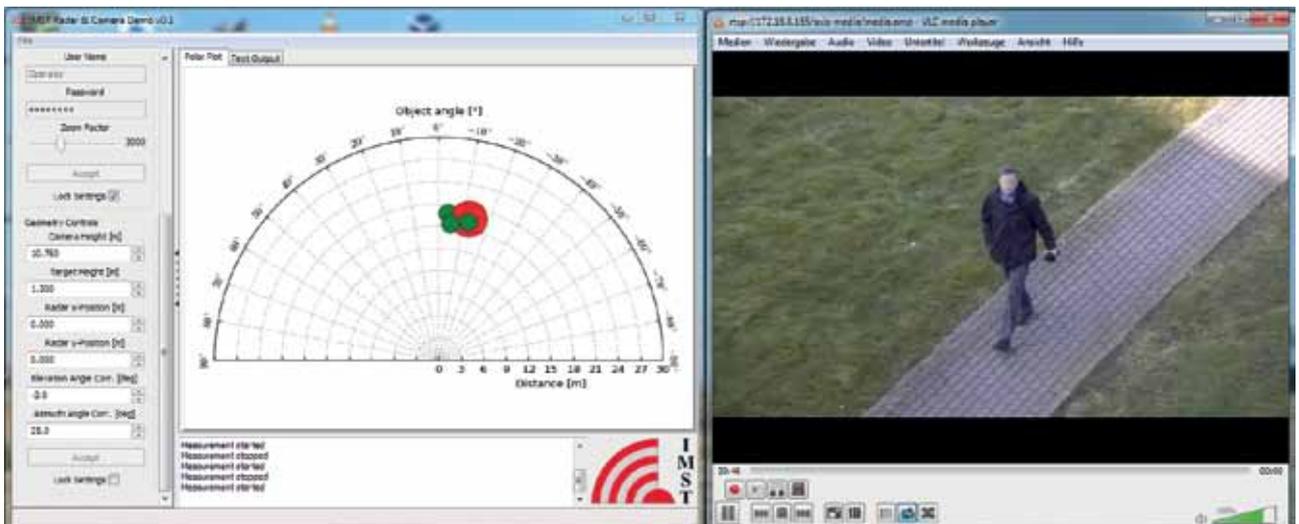
# RADAR APPLICATION NOTE

## INTRUDER TRACKING WITH PTZ-CAMERA



IMST GmbH installed radar test equipment at the backside of the company building with view across the back entrance and the lawn area with two walkways from the car park. The installation was made at the 1st and 2nd floor balconies and includes two radar units, a PTZ (Pan Tilt Zoom) camera and a power control and interface unit. The camera is oriented to the backyard showing the two walkways up to a distance of 30m from the back-entrance to the car park. Each radar unit consists of four radar modules connected to the radar network controller. The azimuth view of each radar antenna is 65° so that three modules can cover a half circle in total. The fourth radar is directed downwards to observe the entrance area directly below the installation. If a person enters the detection area of one of the radar modules, the coordinates in distance and angle will be sent to the radar network controller. The controller collects all detected targets, determines the main one and calculates the coordinates for the PTZ camera. Pan, tilt and zoom commands will be sent via TCP/IP and the local area network of the company to the camera. Recording will be initiated and the camera zoom focus follows the person or intruder as long as he remains in the detection area.

Radar/Camera Control Panel with Intruder Detection and PTZ Functionality

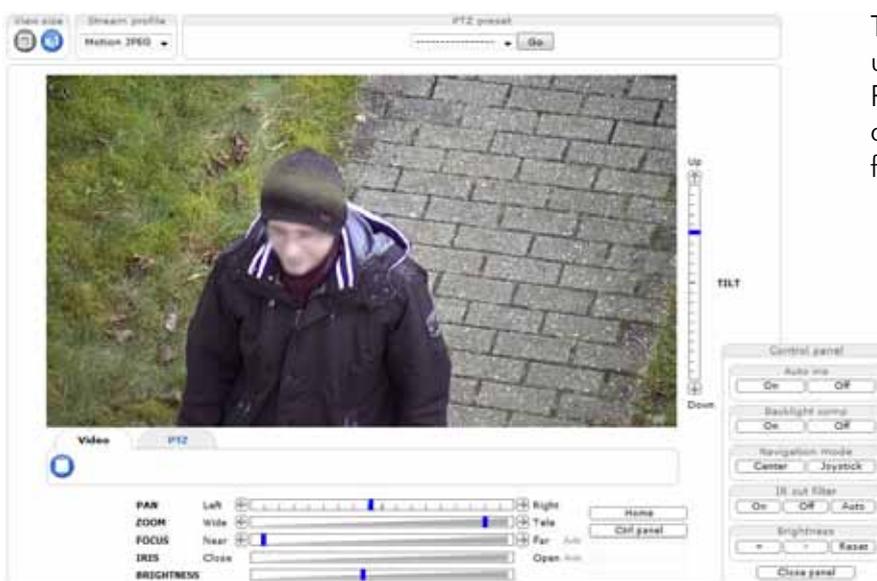


The radar network controller is a Linux board with CAN bus and Ethernet interfaces. Four radar modules of the type sR-1200c ("c" for CAN bus; operating in the 24 GHz ISM band) can be connected to the controller. The board is integrated into the housing of the radar unit. Specific software operates the modules, collects all detections and determines the targets' positions in ground coordinates. Those will then be transformed for the view of the camera. Radar unit and camera can be mounted in different positions communicating via

LAN. An operator control panel allows entering camera and radar parameters as well as mounting height and offset. The preceding diagram visualizes all radar detections above a certain threshold level (in green) and the main target (in red). This will be calculated from targets "live time" and "reflection strength". The camera pictures below show a backyard scenario in overview with an approaching person with no zoom and after person detection and tracking with 12 x optical zoom, which would allow an identification of the person.



The PTZ camera shows an overview of the company's backyard. A person is entering the radar detection zone.



The person was detected by the radar unit. The coordinates were sent to the PTZ camera and the focus was adjusted to the person's torso and face. Identification becomes possible.



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