

Development of 300 GHz walk-through body scanner for security gate inspections

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Public transportation facilities such as airports and high-speed train stations require various security inspections to prevent terrorism and injury incidents, and millimeter (MMW) and terahertz (THz) waves body scanners have been developed. However, faster inspections are required to perform it without stopping the pedestrians. We have developed a prototype of a 300 GHz body scanner for the walk-through gate with walking speed of more than 4 km hr⁻¹ and the spatial resolution of 10 mm. In this prototype, a beam is irradiated at an angle of 45 degrees to the pedestrian to obtain a 3D image near the chest [1].

Because it uses a single transceiver, we requires beam scans to acquire the 3D information. The horizontal scan is done by using the human gait, moving the detection area from right to left according to the gait. The vertical scan is done by vertical optical beam scanning of the receiving beam. And, the depth measurement is done by the FMCW radar measurement. The frequency sweep for the radar is 275-305 GHz during 10 μ s. The transmitter power is more than 20 mW in the whole frequency range and the ratio of the maximum power to the minimum detectable power is about 105 dB. Typical measurement time of acquire the 3D image is about 0.4 sec. The examples of acquired images are shown in Fig. 1 and 2 for a man who is holding a plastic gun in his pocket.

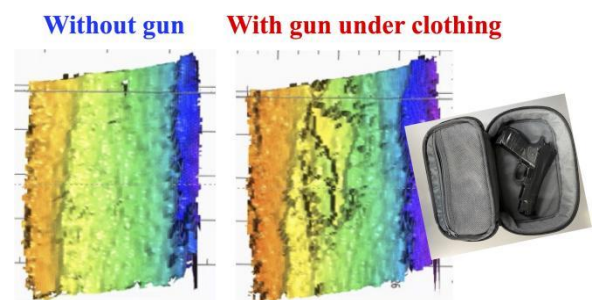


Fig. 1 Acquired images during walking w/o and with a fake gun.

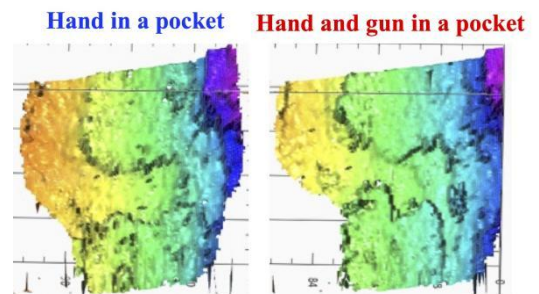


Fig. 2 Acquired images during walking w/o and with a fake gun in hand.

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REFERENCES

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