

TECHNICAL STATEMENT

The subject of this application is a security device for screening persons at safety-critical locations such as airports, Government buildings, and correctional facilities. The subject steps into a small chamber, waits two seconds, and steps out. Almost instantly, security officers have a three-dimensional image that clearly shows any weapons or contraband on the subject's person, including non-metallic objects carried in or under the clothing.

The device operates by measuring the reflections of near-millimeter radio waves at low levels.

A vertical cylindrical shell extends around the subject, with openings for entrance and egress. Between the inner and outer wall of the shell are two vertical masts about two meters tall, each carrying 192 antenna elements arranged vertically. The two masts revolve stepwise 102 degrees around the subject in less than two seconds. While the masts are briefly stationary, a transmitter sequentially feeds the antenna elements. Only one element on each mast transmits at a time, sweeping between 24 and 30 GHz at a rate of 1.1 MHz/ns, so that each sweep takes 5.5 μ s. There is a pause of 2.6 μ s between sweeps. Each antenna element carries out the sweep twice, and then the next element in sequence does the same. The full cycle over all elements on both masts takes 3.1 ms. There is a pause for 5.5 ms while the masts advance about $\frac{1}{2}$ degree, then the cycle repeats, a total of 210 times as the masts rotate through their full arc.

Receivers collect reflected data from various angles. Within another few seconds, the data are processed into a holographic image of the subject that shows any hidden objects. Features include automatic object identification, privacy algorithms, remote viewing, and data logging. There are no further transmissions until the next subject enters the system.

Each device is permanently installed at an indoor, fixed location, and will remain under the control of the experimental licensee. Because the units have limited applications and are expensive -- initial costs will be in the \$100,000-125,000 range -- only a handful at most will be operated at each experimental site.

EMISSIONS LEVELS. Average emissions are below the limits set out in Section 15.209 (-41 dBm). Peak emissions are less than 100 μ W into a 10 dBi antenna, *i.e.*, below 0 dBm EIRP. In present models of the device, the peak-to-average ratio exceeds the 20 dB permitted in Section 15.35(b).

The device complies with the Commission's RF exposure safety rules by a very wide margin, approximately five orders of magnitude.

EXPERIMENTAL PURPOSE. SafeView, Inc. seeks this license in order to conduct experiments directed toward improving the performance of the device, specifically as to the image resolution, scan speed, processing speed, peak-to-average ratio, and power levels required.

PUBLIC INTEREST. Federal and state governments, along with certain quasi-governmental entities such as airport authorities, need methods for reliably locating unauthorized weapons and

other contraband. Undetected, these have the potential to threaten not only citizens' health and safety, but also reliability of transportation, communications, energy distribution, and economic interests generally. Recent terrorist activity has emphasized the urgency of these concerns.

There is an especially urgent need for improved security at the "entry portals" that separate the public at large from persons inside a controlled area such as an airport, stadium, or Government building. Existing methods rely largely on metal detectors and hand searches. But these are widely understood to be inadequate. They create large numbers of false positives, which drives up cost, delay, and public dissatisfaction. They miss many metallic weapons; are inherently poor at finding non-metallic weapons and contraband; create long queue times; and produce ancillary negatives such as allegations of "groping" during hand searches. Moreover, it is rarely practical to hand-search every person passing through a portal. The need to identify individuals for hand searches both raises complaints about "profiling" and opens a route for non-metallic objects to escape detection entirely.

SafeView offers a fast, reliable method to detect hidden weapons, explosives, and contraband of many kinds that would otherwise require intrusive manual searches. Once in widespread use, the device will greatly elevate confidence in public safety.