

**Scanning Thermal Optical Measurement Platform for Ulcer Detection
in High Risk Diabetic Patients**

By

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ABSTRACT:

World wide there are two hundred and forty six million people with diabetes. Twenty million of these people are living in the United States. As the epidemic of diabetes increases, ulcers, blisters, sores, and cuts become all the more inherent problems. As a result, there is a growing market for early detection devices. Every year approximately 12 million people report some issue of mobility limitation. According to a recent study through NIH, 50% of all amputations are directly attributed to diabetes. Furthermore, 25% of all diabetic hospital visits are related to diabetic foot complications.

Through several clinical studies it has been proven that early detection leads to an 85% reduction in ulcer formation. Currently it takes approximately 17 days for an ulceration to heal prior to breaking the skin. Once the ulceration has broken the skin it takes approximately 77 days to fully heal, and that's if it fully heals. Studies have shown that ulcerations form a "hot spot" of around 2.2°C. This can easily be detected several days prior to breaking the skin using the right technology. The device is a unique design targeted specifically at the diabetic foot. The device uses there algorithms to detect changes in the feet as soon as they appear alerting the patient before it is too late. It is estimated that last year alone medical insurance spent approximately \$1.5 Billion on ulcer related complications associated with diabetes.

The apparatus itself consists of a thermal imaging micro chip known as a CMOS (Complementary metal-oxide-semiconductor) which will dive into the realm of thermal mapping to reveal what is not visible to your naked eye. The scanner will input a patient's foot then the software will completely analyze the image and/or data via customized software. This analysis software will include the ability to measure and detect deformities, temperature spikes, and reduced blow flow. Furthermore, the software is designed to identify these changes to the user offering highlighted problem areas.

The device has several output options, first and foremost is to save to a file on the users computer. Second, would be an external flash drive used for storage, or perhaps an external hard drive. The third option is to print the results in hardcopy allowing the user to physically store the information. The device is also designed to fax or email the users doctor if and only if high priority alerts are detected following HIPAA regulations.