

A citizen's dosimeter, and it fits in your wallet

July 1 2011



Adam Hutter, Director of NUSTL, presents Cecilia Murtagh (center) and Gladys Klemic with plaques commemorating DHS's first patent. Not pictured: co-investigator Paul Bailey, now at the University of Maryland. Credit: Jenny May

No matter how many plastic cards currently crowd your wallet, one day you may wish to make room for one more. The Department of Homeland Security (DHS)'s Science and Technology Directorate (S&T) has developed a miniaturized version of a dosimeter, a portable device used for measuring exposure to ionizing radiation, which can provide life-saving early detection in the unlikely event of a nuclear accident or dirty bomb.

Dubbed the Citizen's Dosimeter, this high-tech plastic card would be as

convenient and affordable as a subway card, with the capability to measure the amount of radiation on a person or in a given area.

The National Urban Security Technologies Laboratory (or NUSTL, pronounced new STEEL) located in New York City and managed by DHS S&T, has been awarded a patent that covers the development of radiation dosimetry technologies – DHS's first patent.

Currently, personal radiation dosimeter badges are worn in nuclear plants, but a plant dosimeter cannot be read on the spot; it must be sent to a processing lab to determine an individual's radiation dose. While a final prototype has not yet been built, a workable blueprint for a wallet-sized card that can detect radiation in real time is now in place.

"We were inspired by the Metro cards we use every day to get around Manhattan, and envisioned a dosimeter with that level of convenience," says Gladys Klemic, a NUSTL physicist who managed the project from Illinois. Klemic believes a dosimeter in this form could benefit both emergency responders and the general public.

Klemic and her team at NUSTL set out to create a dosimeter that would meet American National Standards Institute (ANSI) requirements for personal radiation dosimeter badges, and incorporate commercially available components to decrease the size and lower the price tag.

NUSTL began by using radiation-sensitive material from Landauer, Inc., a commercial dosimetry provider in Illinois, testing materials of varying thicknesses and combinations to determine how thin they could make the card while still achieving the targeted performance.

After testing nearly a half a dozen materials, the NUSTL scientists determined that using the chemical element tantalum allowed them to obtain accurate readings with minimal thickness. Combining this

element in a unique double-layer, stainless steel filter helped to reduce false positives. It was this unique design that led to the patent award.

The next step is to develop a card reader to reveal the radiation dose measured by the Citizen's Dosimeter. In the event of a nuclear incident, first responders equipped with a card reader would immediately be able to measure radiation exposure for anyone carrying the Citizen's Dosimeter. While it will be years before a card and reader can be prototyped, tested, certified and wallet-ready, NUSTL has lined up a team to support the effort, including:

- Engineers at StorCard, a California-based group that has previously developed a prototype credit-card floppy disk and reader
- Nomadics, an Oklahoma engineering firm
- Radiation detection experts at Landauer and Oklahoma State University

The Citizen's Dosimeter represents a technological breakthrough and the next generation in radiation detection. It also demonstrates how public-private partnerships can work to produce life-saving solutions – in this case, protecting the nation from [radiation](#) resulting from an act of terrorism or natural disaster.

Provided by US Department of Homeland Security - Science and Technology

Citation: A citizen's dosimeter, and it fits in your wallet (2011, July 1) retrieved 18 April 2024 from <https://phys.org/news/2011-07-citizen-dosimeter-wallet.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.