Los Alamos
NATIONAL LABORATORY
EST. 1943

LA-UR-14-27559
Approved for public release; distribution is unlimited.

Title: LANL12-RS-108J Device Modeler Tool Kit - DMTK Final Report for FY14

Author(s): Temple, Brian Allen
Pimentel, David A.

Intended for: Report

Issued: 2014-09-28

Disclaimer:
Los Alamos National Laboratory, an affirmative action/equal opportunity employer,is operated by the Los Alamos National Security, LLC for the National NuclearSecurity Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Departmentof Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

LANL12-RS-108J
Device Modeler Tool Kit - DMTK
Final Report for FY14

Brian Temple and David Pimentel

This document is the final report the Device Modeler Tool Kit (DMTK) for project LANL12-RS-108J in FY14. The deliverables for project LANL12-RS-108J were the following:

1) Incorporate a new interface for the INVERSE software developed by ORNL and LANL in DMTK.
2) Evaluate the effects of utilizing a catalog of starting models on time-of-solution inverse models in the DMTK.
3) Develop a methodology to include a sensitivity/uncertainty in gamma-ray diagnostics and inferred quantities.
4) Provide a mid-year review.
5) Testing and evaluation of DMTK modification by modeling team.

A summary of each deliverable is given below.

1) Incorporate a new interface for the INVERSE software developed by ORNL and LANL in DMTK.

An improved interface for the INVERSE program was incorporated into the DMTK software in early March 2014. The details behind the work were documented in LA-CP-14-00241 and that report has been sent to the TI projects POC.

2) Evaluate the effects of utilizing a catalog of starting models on time-of-solution inverse models in the DMTK.

A catalog of starting models was incorporated into DMTK. The models and how they are implemented in DMTK are documented in LA-CP-14-00901. The report has been provided on the classified network to the TI projects POC.

3) Develop a methodology to include a sensitivity/uncertainty in gamma-ray diagnostics and inferred quantities.

A study of the sensitivity and uncertainty associated with inferring quantities from gamma diagnostics was performed and a methodology to evaluate this data was documented by Pete Karpius, Sy Stange, and Theresa Cutler in NEN-2. The study and the methodology is documented in LA-UR-14-27403. This report is being sent to the TI POC at the same time as the final report.

4) Provide mid-year review

A mid-year review was provided and presented.

5) Testing and evaluation of DMTK modifications by modeling team.

The DMTK software has been available on the LANL classified network for any of the device modelers to test. At this time a few of the modelers and modeler trainees have tried the software. Feedback has been provided and modifications have been made on the newest alpha version of the code. The modifications are listed in a recent document that is pending a LA-UR. The document will be provided with this final document to the TI project POC.