THE DISPATCH

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Program Manager's Corner

DTRIAC has continued working hard over the past quarter to better serve the end user, and I'm pleased to announce some noteworthy accomplishments since the first edition of the reinstated DTRIAC Dispatch in June 2011.

Among the chief improvements for STARS-U users is the successful transition from RSA Secure tokens to the use of a CAC for all DoD users. The target date for non-DoD users is November, as DTRIAC works toward a smart card solution for those users.

Additionally, we've received feedback that the search capability within STARS is not as helpful as many other search engines. We are aggressively working to improve not only the look and feel of STARS but also provide a much more powerful search engine that should vastly improve the search experience. We are also looking to federate with other related databases, DTIC for example, to further support users' research efforts.

This edition of The Dispatch highlights the collection in general and how some of our resources have contributed to a variety of research efforts. We've mapped out a content plan for upcoming editions of The Dispatch for the subsequent 18 months, and future issues include focused themes on film and photographs, unique (or "orphaned") collections, our sister organization here on Kirtland AFB, the Defense Nuclear Weapons School (DNWS), among other themes. Each subsequent edition of The Dispatch will include a list of all additions to DTRIAC during the previous quarter, and two recurring sections: "Ask the IAC" and an Information Management article.
As stated last quarter, we solicit inputs from the entire CBRN and CWMD communities; government, academia, and industry. If you have any comments or questions at all, please do not hesitate to contact me at craig.hess@dtra.mil or at (505) 846-2071. We are here to serve.

Thanks,
Lt Col Craig Hess
DTRIAC Program Manager

DTRIAC Rolls Out CAC-Enabled STARS Access

STARS-U users with common access cards (CACs) will no longer need to have both a CAC and an RSA token to access STARS-U. Instead, users will be given the option to log in with the same CAC used for logging into their desktop computer. This process will benefit users by eliminating the need for an RSA token and the irritation of having one more system with unique access requirements. For DTRIAC and DTRA IA, this will make the system more secure and reduce costs and reporting requirements.

STARS-U users will see options to log in using a CAC, to associate a CAC with an existing STARS-U account, to login using an RSA token, or to register for a new STARS-U account. Pick a logon option and step through the associated process. From then on CAC holders will be able to use their CAC and will no longer need the RSA token!

DTRIAC Information Available

In an effort to reach the largest audience possible with the most up-to-date and relevant information on the organization, DTRIAC has several web sites tailored to educate different audiences. DTRIAC's external public site is available at http://www.dtriac.dtra.mil; a link can be found on the DTRA homepage. This site contains general information about DTRIAC, offers a number of informational brochures available for download, describes how DTRIAC supports the broader DTRA CWMD mission, and provides a link to DTRIAC's unclassified research site (STARS-U).

The STARS-U site, https://stars.dtra.mil, is a private site that requires an account and hosts the DTRIAC unclassified document, film, and photograph information used by researchers and academia. In addition, DTRIAC has two private intranet sites accessible by DTRA personnel on the DTRA1 Portal. The first site for DTRIAC information can be found under the "How Do I" tab. This site points personnel to DTRIAC and shares information about how to access DTRIAC services and products. The second site is a DTRIAC SharePoint team site that acts as a working collaboration portal for DTRIAC personnel. Some portions of the site are open to all DTRA personnel while other portions are restricted to DTRIAC personnel only.

DTRIAC Provides Assistance to Real-World Events

The DTRIAC reference collection dates back to 1946 and currently contains over 400,000 abstracts and over 150,000 digitized scientific and technical information (STI) items, including reports and documents, photographs, film, waveforms, tables, and diagrams. While the majority of items relate to nuclear testing, the collection also contains significant STI across the spectrum of chemical, biological, radiological, and nuclear (CBRN) topic areas.

Mount St. Helens

According to a 1989 article in the *New York Times*, a military transport required an emergency landing due to engine failure attributed to ash from Mount St. Helens eruption in 1980, resulting in DoD's study of the effects of nuclear dust on aircraft engines[1.] The results of those tests were placed in the DTRIAC for future reference.

With such a broad information collection to draw upon, U.S. government agencies frequently employ DTRIAC in response to information requests related to real-world events. Such was the case on 14 April 2010, when the world's attention was on the eruptions of Eyjafjallajökull in Iceland and the threat posed by the potential effects of volcanic ash on aircraft engines. Shortly after this event, aviation industry companies (e.g., airplane engine manufacturer Rolls-Royce) and other government agencies (e.g., NASA) began asking DTRA for copies of the previously completed military tests. As a result of a coordinated effort between the DTRIAC staff and DTRA Public Affairs, 14 reports were located and made available to the public. Copies of these reports can be found at http://www.dtra.mil/Info/FOIA/FrequentlyRequestedRecords.aspx.

If your mission involves collecting and analyzing data across the DTRA CBRN threat response area and you believe DTRIAC may have information you need, do not hesitate to contact DTRIAC for up to 8 hours of free research assistance. You can also sign up for a STARS account and gain direct access to DTRA's comprehensive information collection.

[1]New System Warns of Volcano Dust, but a Plane Still Flies Into Trouble, New York Times, 19 Dec 89, Article Collections: Anchorage, Science. http://www.nytimes.com/1989/12/19/science/new-system-warns-of-volcano-dust-but-a-plane-still-flies-into-trouble.html?src=pm

Eyjafjallajökull in Iceland

Users Experience

On a recent visit to DTRIAC, I was tasked to evaluate the usability of the Scientific Technical Information Archival and Retrieval System (STARS) and assess the quality of the material. I sat down at the STARS terminal with less than two minutes of familiarization and little specific knowledge of what I was looking for. Armed only with a 29-year general knowledge of nuclear weapons from my past assignments and educational efforts, I decided I would start with the BAKER test from 1946 and see what sort of information I could glean about the target ships. I had a particular interest in the captured German Heavy Cruiser Prinz Eugan, as I had flown over her wreck at Enubuj Island in the Kwajalein Atoll back in 1990. To my pleasant surprise, using only the basic search engine of STARS, I instantly obtained eight hits on documents alone. None of the eight had been electronically scanned into the database, but since I was in close proximity of the knowledgeable DTRIAC staff, I had the first three documents in my hands in less than 10 minutes. The first document was an article about the radiological survey taken of the wreck in the 1970s when the Navy was trying to determine if the ship was safe for salvaging. I also had the damage reports for the ship following both the ABLE and BAKER tests—complete with intimate damage details and many pictures. The documents provided priceless pretest and posttest measurements and detailed assessments. As I read each page, I could see more and more potential applications for this database. Furthermore, I thought of several dozen other things I could search for and uses I could make of the data if I were going to do any similar testing.

Prinz Eugan

An additional 15 to 20 minutes using the search engine unveiled lists of other ships involved in the tests, locations where sensors were placed to record the data, damage reports, lists of sunken ships, and even divers' surveys of the wrecks taken years later. Although these early nuclear weapons tests were conducted when the full effects of the weapons were not understood, the relevance of information was striking. From a historical perspective,it also was amazing to see how much safety has improved as a direct result of these early tests.

Kwajalein Atoll

It was easy to see dozens of potential applications in the modeling and simulation arena for the available data. As I continued to explore the library, I was able to easily find data on weapons systems that I have dealt with in the past as well as test reports from several ICBM tests that I directly worked on. There are also numerous keywords that will reveal multitudes of data on various types of effects. The bottom line here is there is no reason for anybody to have to reinvent the wheel when a half day spent in the archives can easily show you what has been done in the past.

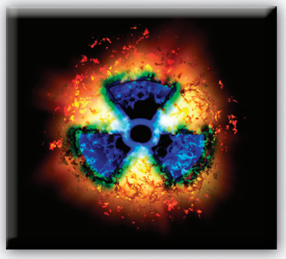
Perhaps the most relevant application for this database is as a lessons learned repository. For more than a decade. I have been personally concerned regarding the loss of our experience and knowledge in the nuclear weapons test arena. But this repository captures thousands of documents, pictures, films, etc; and, with just a little bit of time and familiarity, it is all at one's fingertips. The Air Force Operational Test and Evaluation Center maintains a long, current lessons learned archive. Before any test director/manager is allowed to even begin planning a test, they are required to review this list for things applicable to them. As I sat and searched STARS, I started asking myself what sort of lessons learned I like to know. Again, within minutes I had found several dozen topic areas—many times with pages of applicable documents listed.

How can I submit a document into the collection?

Connie Salus, DTRIAC's Chief Information Analyst, responds: "There is not a formal process to submitting documents into the collection. We accept anything (technical reports or other documents) that applies to DTRA's broad mission." Having said that, contact Connie at connie.salus_contractor@dtra.mil or 505-846-9448 if you have anything you would like to archive at DTRIAC. The DTRIAC annex, the STI Support Center, is located at HQ DTRA on Fort Belvoir and provides a convenient on-site location in the national capital region for individuals seeking to submit technical content. Although we are developing standards for new technical reports, our mission is to subsume all relevant information into the IAC for DTRA's use. To that end, if the document is legible, we are happy to work with you. Once accepted, the document will be scanned (if required) and added to the DTRIAC catalog. DTRIAC also provides quality assurance, checking for duplicates, updating security markings and distribution statements, evaluating and correcting the quality of the digital scans, and writing missing abstracts for the catalog entry. It may be one to two weeks before a submitted entry is available for a patron on STARS. However, when mission-critical requirements dictate, DTRIAC can accommodate specific customer requests and make documentation available within 24 hours.

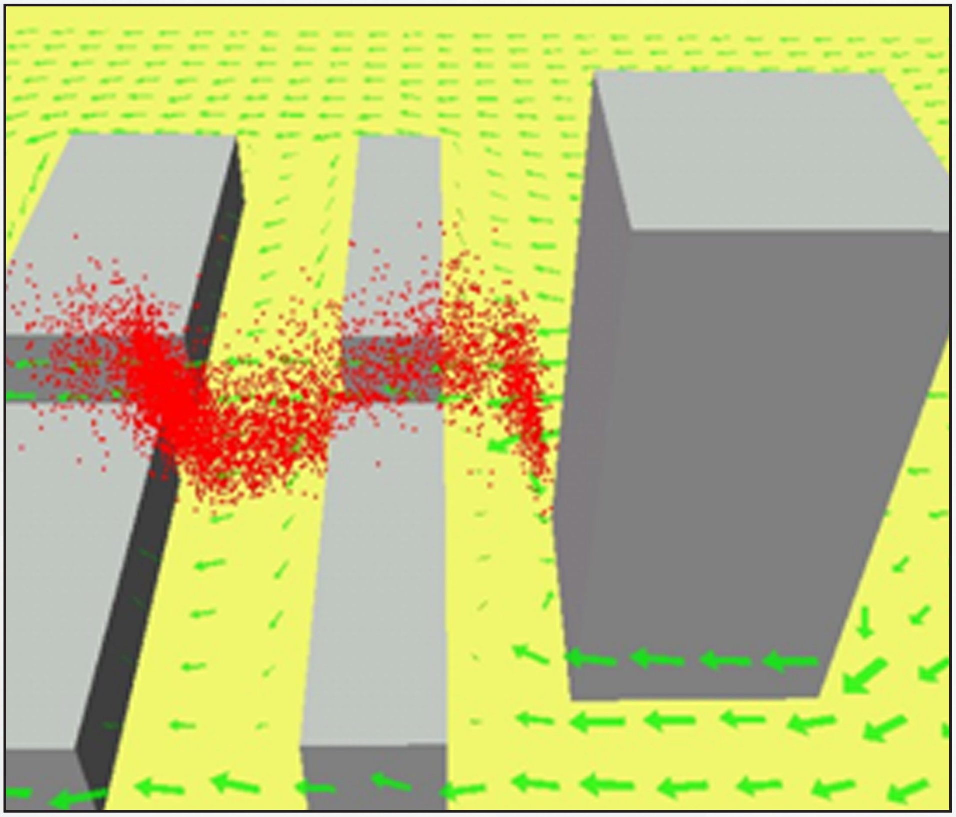
Radiological Material Transport

DTRIAC represents DTRA's institutional knowledge and forms its repository for a range of combating weapons of mass destruction data and resources. As part of its charter, DTRIAC supports the collection, processing, analysis, and dissemination of scientific and technical (S&T) data for DTRA's mission areas. This article highlights S&T efforts at Defense Advanced Research Projects Agency (DARPA) with potential application to ongoing efforts in modeling and simulation to address wide area recovery from the effects of radiation release.



Timely and effective recovery is paramount in minimizing the impact of a catastrophic radiation release from terrorist incidents or technological disasters. The ability to perform wide area recovery is dependent on understanding the nature, extent and duration of the hazard. This situational awareness convolves ground truth data—derived from sensors and sampling—and predictive modeling. Hazard prediction modeling provides a hazard footprint based on source term, method of release, weather, and terrain. The challenge is the capability to perform hazard prediction in complex terrain such as urban areas and to account for radiation dispersion on both horizontal and vertical surfaces. This detailed understanding of ground deposition is necessary to overlay the hazard on critical infrastructure, vector reconnaissance efforts, and initiate decontamination and recovery activities.

The DARPA Radiation Decontamination program represents an S&T effort to develop and demonstrate techniques capable of decontaminating structures contaminated by the detonation of a radiological dispersion device. A component of interest in this effort is the capability to provide systems-level simulations of the location and degree of contamination in an urban environment. This was accomplished by modifying the MESO (for "MESO-scale") / Realistic Urban Spread and Transport of Intrusive Contaminants (RUSTIC) tool to compute radiation dose from a radioactive dust source and to output the results in a convenient manner. An advantage of this tool is the capacity to represent deposition on both horizontal and vertical surfaces by accounting for turbulence, surface velocity and surface roughness.



MESO/RUSTIC is a coupled technique that simulates atmospheric dispersion and transport of chemical, biological, radiological, and nuclear particulates. MESO is the random-walk tracer-based transport model, and RUSTIC is the wind-flow model. The dose computations were performed by a stand-alone capability that reads deposition files from MESO/RUSTIC and computed the dose at selected points in the urban terrain. Additional routines were developed to integrate over all exposed surfaces, (e.g., the ground and building walls) and to sum the total dose based on the amount deposited on the various surfaces.

In order for the results of the computations to be useable, an extensible visualization framework, RDSim, was developed. RDSim reads the deposition file from a database of MESO/RUSTIC runs and displays the contaminated areas of the buildings and computes the dose levels. Existing capabilities include the ability to decontaminate a region of the urban terrain and investigate the reduction in dose. RDSim is designed to include future capabilities to support modeling efforts of the Radiation Decontamination program, including diurnal and weather effects on the contamination.

For additional information, please contact: Vernon Smith (719-599-1936; vern.smith@itt.com)

Collection - Health Physics

On 11 March 2011, DTRIAC efforts at updating our understanding of radiation effects on personnel gained greater immediacy when the Tohoku earthquake precipitated a series of large tsunami waves that pounded the east coast of Japan.

This natural disaster soon led to a subsequent technical crisis with several nuclear power facilities suffering damage, including Onagawa, Higashidori, Tokai, Tsuruga, Rokkasho, and TEPCO`s Fukushima Dai-ichi and Dai-ni. The most serious consequences occurred at Fukushima Dai-ichi, where loss of power led to damage to the fuel from overheating and resulting hydrogen gas explosions venting radiological contamination from the facility. This tragedy reinforced the importance of timely and accurate data to address the aftermath of technological or deliberate release of radiation into the environment.

The DTRIAC collection contains a wealth of nuclear effects data to include radiation effects on personnel. It is for this reason DTRIAC is supporting key DTRA efforts to develop greater understanding of radiation effects, update key planning documents, and promulgate emerging research throughout the nuclear effects community. The update of EM-1, chapter 14, "Effects on Personnel," illustrates one key initiative. In the light of the recent incident at the Fukushima Dai-ichi nuclear power plant in Japan, this revision is even timelier.

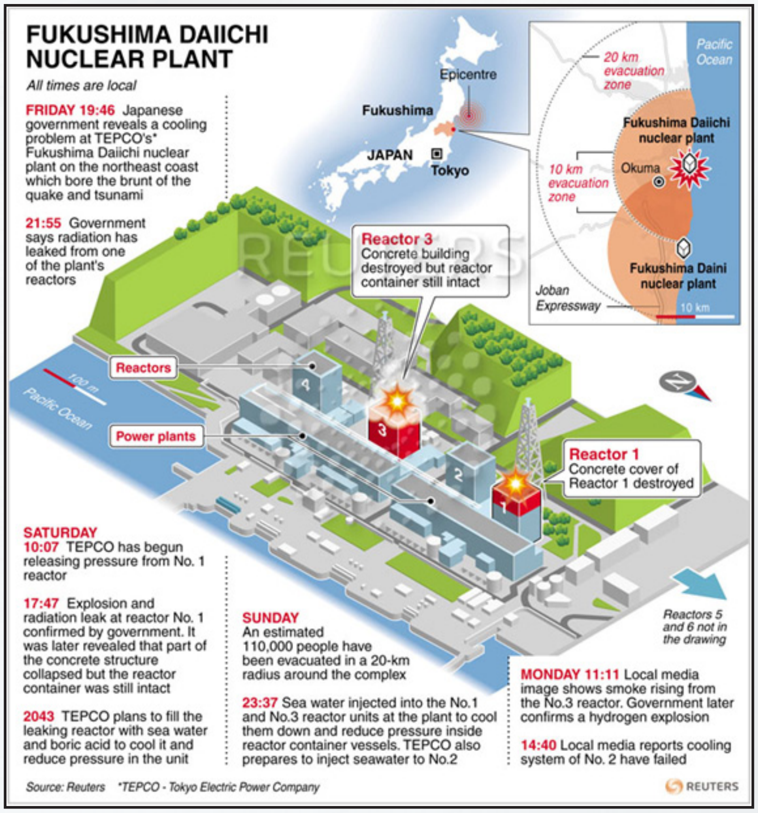
Last updated in 1993, EM-1, chapter 14, requires expansion to capture new research and insights. Sections on combined injury, psychological effects, and modeling and simulation will be added. Our increased understanding of the pathophysiology and treatment of acute radiation sickness (ARS) as the result of time-phased appearance of radiation effects on most organ systems rather than the traditional dose-related response of the hematopoietic, gastrointestinal, and cardiovascular/central nervous systems will be reflected. Because of the changing threat environment that directly targets civilian rather than military populations, the effects of demographic factors such as age, gender, and comorbidities on radiation response will be covered.

Late effects, both stochastic (neoplastic) and deterministic (cardiovascular and cerebrovascular disease as well as cataracts) will be discussed. In the past few decades the importance of the cutaneous radiation syndrome has become better understood, and a subsection will be devoted to this as well. The expanded and technically updated chapter will hopefully be of even more value to planners and medical personnel.

Another significant undertaking is DTRIAC publishing of U.S.-funded, Russian-conducted research on long-term exposure to radiation. This singular research and resulting papers mark a significant contribution to our collective understanding of radiation effects on personnel.

After the breakup of the Soviet Union, the United States was concerned about the potential for scientists formerly involved in the nuclear weapons program to market their expertise abroad in an effort to make a living. To prevent this, the Defense Nuclear Agency (DNA) participated in initiating cooperative work with scientists and physicians in Russia and Kazakhstan by supporting their continuing work in related fields not involved in weaponry. One of these programs was entitled "Long-Term Evaluation of Irradiated Personnel" and involved the subject of biological effects of radiation from the Former Soviet Union's nuclear weapons program, from start (radiation exposure from fuel generation in reactors) to finish (effects of fallout from atmospheric weapons testing in Kazakhstan on the surrounding populations). Twenty-four scientific documents were obtained under contract with the intent to publish these documents and make them available to the worldwide scientific and medical community.

The Armed Forces Radiobiology Research Institute, then part of DNA, published 12 of these documents between 1994 and 1998. DTRIAC took the initiative to complete editing and publication of nine of the remaining documents from 2006 to 2008. This international collaborative effort has contributed much valuable information to scientists worldwide.



DTRIAC Collection Editions

DTRA Technical Reports

DTRA-TR-06-4, Imbedded EM Protection Technology
DTRA-TR-09-20, Continued E3 Technical Assistance to Program Manager Tactical Operation Centers (PM TOC)
DTRA-TR-09-27, 3.4.3 Enhanced NaI Gamma Analysis Evaluation and Implementation
DTRA-TR-09-34, Virtual World Proof of Concept
DTRA-TR-10-33, Active Interrogation Workshop
DTRA-TR-10-44, SWET3-D Final Report; 3D Rad-Hydro Simulations of Nuclear Weapon Portal Attack on Tunnel Targets
DTRA-TR-10-73, Detector System Test and Comparison Campaign
DTRA-TR-10-74, MARSI FLETC Demonstration Exercise, Final Report
DTRA-TR-11-4, 2010 Technology Readiness Evaluation of Defense Threat Reduction Agency Basic and Applied Sciences Directorate

DTRA Small Business Innovation Research

DTRIAC 68240, Standoff Sensing for Low Volatility Chemicals Using Terahertz
DTRIAC 68254, Scaling Radiation Fault Sensitivity Analysis to 45 nm CMOS SOI Processes and VLSI Circuits
DTRIAC 68255, Advanced Prompt Gamma Simulator

This Quarter in History

16 July 1945
The first successful atomic bomb (the "Gadget") is detonated near Alamogordo, New Mexico. The TRINITY event was the culmination of years of work under J. Robert Oppenheimer and his team, known as the Manhattan Project.

6 August 1945
The Enola Gay from the 393rd Bombardment Squadron, taking off from Tinian in the West Pacific, dropped an untested "Little Boy" design over Hiroshima, resulting in roughly 13 kilotons of atomic yield at 580 meters above and 240 meters away from the Aioi Bridge (the original aim point).

9 August 1945
The Bockscar dropped a second weapon, the "Fat Man" designed after the "Gadget," over Nagasaki. After this second use of an atomic weapon, the Japanese government formally surrendered to the Allied Forces on September 2, 1945.

4 August 1977
U.S. Congress creates the Department of Energy, which is to be responsible for nuclear weapon development and testing. The Defense Nuclear Agency had been charged with nuclear effects testing since 1971.

Atomic cloud from "Little Boy" rising over Nagasaki, taken from one of the three B-29 Superfortress bombers on the mission. (Photo credit: USAF)