

DEFENSE TECHNICAL INFORMATION CENTER

2012 DTIC Conference

Connecting Lab Research with the Warfighter

March 27-28, 2012

DTRIAC's Net-Centric Knowledge System

Vision for Tomorrow...Results Today

27 March 2012

Moderator: Ms. Karen Borrows



DTRIAC's Net-Centric Knowledge System

**Mr. Javad Sedehi,
DTRIAC**

DTRIAC's Net-Centric Knowledge System

Vision for Tomorrow...Results Today

***Mr. Javad Sedehi
27 March 2012***



Agenda



- DTRIAC is an IAC
- Understanding DTRA
- DTRIAC's role in DTRA Information Management
- Knowledge Management Challenges
- Next Generation STARS
- Search powered by Solr/Lucene





Defense Threat Reduction Information Analysis Center is an IAC



DTRIAC is an IAC



- Formal organizations chartered by DoDI 3200.14* to help locate, analyze, and use scientific and technical information
- Largest IAC within DoD
- Staffed by Scientists, Engineers, & Information Specialists
- IAC Functions
 - Establish and Maintain Comprehensive Knowledge Bases
 - Provide In-Depth Analysis Services and Create Specialized Information Products
 - Perform Additional or Special Activities

* Principles and Organizational Parameters of the DoD Scientific and Technical Information Program,
June 28, 2001



Understanding the DTRA in DTRIAC

DASA – 1961 – 1971

DNA – 1971 – 1996

DSWA – 1996 – 1998

DTRA – 1998 – 2012



DTRA



DTRA is the U.S. Department of Defense's official Combat Support Agency for countering weapons of mass destruction. DTRA's programs include basic science research and development, operational support to U.S. warfighters on the front line, and an in-house WMD think tank that aims to anticipate and mitigate future threats.

DTRA Missions



▶ Nunn-Lugar Global Cooperative Initiative

"Some may say that we cannot forge cooperative non-proliferation programs with the most worrisome nations. But evidence proves that such pessimism is unwarranted." ([read more](#))



▶ Arms Control and Verification

"I don't have to tell you that in today's world the existence of nuclear weapons could mean, if not the extinction of mankind, then surely the end of civilization as we know it." ([read more](#))



▶ Chemical and Biological Defense

"We must support the ongoing revolution in the life sciences by seeking to ensure that resulting discoveries and their applications, used solely for peaceful and beneficial purposes, are globally available. At the same time, we must be mindful of the risks throughout history posed by those who sought to misuse the products of new technologies for harmful purposes." ([read more](#))



▶ Consequence Management

"A full scale nuclear exchange, lasting less than 60 minutes...could wipe out more than 300 million Americans, Europeans, and Russians, as well as untold numbers elsewhere. And the survivors would envy the dead." ([read more](#))



▶ Nuclear Deterrence and Defense

"To put an end to Cold War thinking, we will reduce the role of nuclear weapons in our national security strategy, and urge others to do the same." ([read more](#))



▶ Nuclear Deterrence and Forensics

"Today, the Cold War has disappeared but thousands of those weapons have not. In a strange turn of history, the threat of global nuclear war has gone down, but the risk of a nuclear attack has gone up." ([read more](#))



▶ Reachback

"DTRA offers a unique asset to DOD and the entire U.S. Government for combating WMD. It alone in the U.S. Government has a mandate for combat support, operations, and research and development which extends to all three pillars of the National Strategy and all three WMD threats - chemical, biological and nuclear." ([read more](#))

DTRA Info Management



“Provide a knowledge-based environment to domestic and allied executive-level decision makers, supporting detection, deterrence and defense against global WMD threats – anytime, anywhere” (DTRA J6)

- Threat environment is both dynamic and evolving (CBRNE)
- Technology innovation is accelerating data volume growth
- Organizations are becoming increasingly data-driven (DTRA, IC, DoD, Fed, State, Local, and Allies)
- Individuals are burdened to extract data from multiple sources (DTRIAC, CBRNIAC, program data, etc.)

DTRIAC Customers



DOD Customers

OSD

- OATSD(NCB)/NM
- ASD(R&E)

DTRA

- RD, OP, BE, ASCO, CB
- DNWS

DIA

Joint Staff

MDA

Combatant Commands

- STRATCOM
- PACOM
- EUCOM
- SPACECOM
- JFCOM
- TRANSCOM
- CENTCOM
- SOCOM
- NORTHCOM
- SOUTHCOM
- AFRICOM
- USFK

Other IACs & Contractors

Service Customers

US Air Force

- AFNWC
- AFMC
- AFRL
- AFIA
- AFTAC

US Army

- USANCA
- WES
- ARL
- ACE

US Navy

- NSWC
- NAVSEA
- SSPO

USMC

Academic Institutes

- USMA
- USAFA
- AFIT

Non-DOD Customers

NASA

Intelligence Community

Department of Energy

- SNL
- LANL
- LLNL
- Oak Ridge NL
- NTA
- NNSA

Department of Homeland Security

Department of State

NARA

NGA

NGIC

NSA

US Geological Survey

Veterans Affairs

Customers in green have current TATs



DTRIAAC-enabled Information Support



DTRIAC Mission



The DTRIAC is established to acquire, digest, analyze, evaluate, synthesize, store, publish and *disseminate* scientific and technical data pertaining to **all** of DTRA's mission areas.

REVISED CHARTER FOR THE
DEFENSE THREAT REDUCTION
INFORMATION ANALYSIS CENTER (DTRIAC)
FORMERLY THE DOD NUCLEAR
INFORMATION ANALYSIS CENTER (DASIAC)

1. NEED

In 1964 DDR&E established the Defense Atomic Support Agency Data Center (DDC) to ensure the collection and preservation of the nation's nuclear test data and to provide a center of knowledge in that area. The DDC was renamed the Defense Atomic Support Information Analysis Center (DASIAC) and was subsequently renamed in 1972 the DoD Nuclear Information Analysis Center (DASIAC). The DASIAC was chartered by the Department of Defense (DoD) in accordance with DoD Instruction 3200.14 in order to acquire, digest, evaluate, synthesize, store, publish, and disseminate worldwide scientific technical information dealing with nuclear testing.

Over the years, DASIAC has served the needs of the Defense Atomic Support Agency (DASA) and its successor agencies, the Defense Nuclear Agency (DNA) and the Defense Special Weapons Agency (DSWA), and in 1998 when DSWA became a part of the Defense Threat Reduction Agency (DTRA), DASIAC continued to support the evolving mission needs of DTRA. As the agency's mission has expanded, the DASIAC expanded its areas of expertise to include weapons effects technology, nuclear weapons operations, arms control technology, information systems, and education and training. In the Spring of 2000, the DTRA officially changed the DASIAC name to the Defense Threat Reduction Information Analysis Center (DTRIAC) to reflect its expanded mission and functions and association with the DTRA. This revised charter reflects the name change, mission expansion and the expansion of existing R&D functions to include Technical Area Tasks (TAT).

In order to support and assist the DTRA in the performance of its mission areas and to provide it with a collection of its accumulated knowledge, an information analysis capability is needed. The DTRIAC provides support to all DTRA directorates as well as other DoD and government agencies, the Services, and DoD contractors.

2. MISSIONS AND FUNCTIONS

A. By DoD Directive 5105.62, dated September 30, 1998:

The mission of DTRA is to reduce the threat to the United States and its allies from nuclear, biological, chemical (NBC), other special weapons, and from conventional weapons, through the execution of technology security activities, cooperative threat reduction (CTR) programs,

DTRIAC has major reference collections of documents, photographic data, and films and can search, retrieve and perform analyses on DTRA-internal and community-wide nuclear/conventional weapons phenomena, effects and technology matters and related nuclear/conventional technology transfer applications. The following are major DTRIAC components:

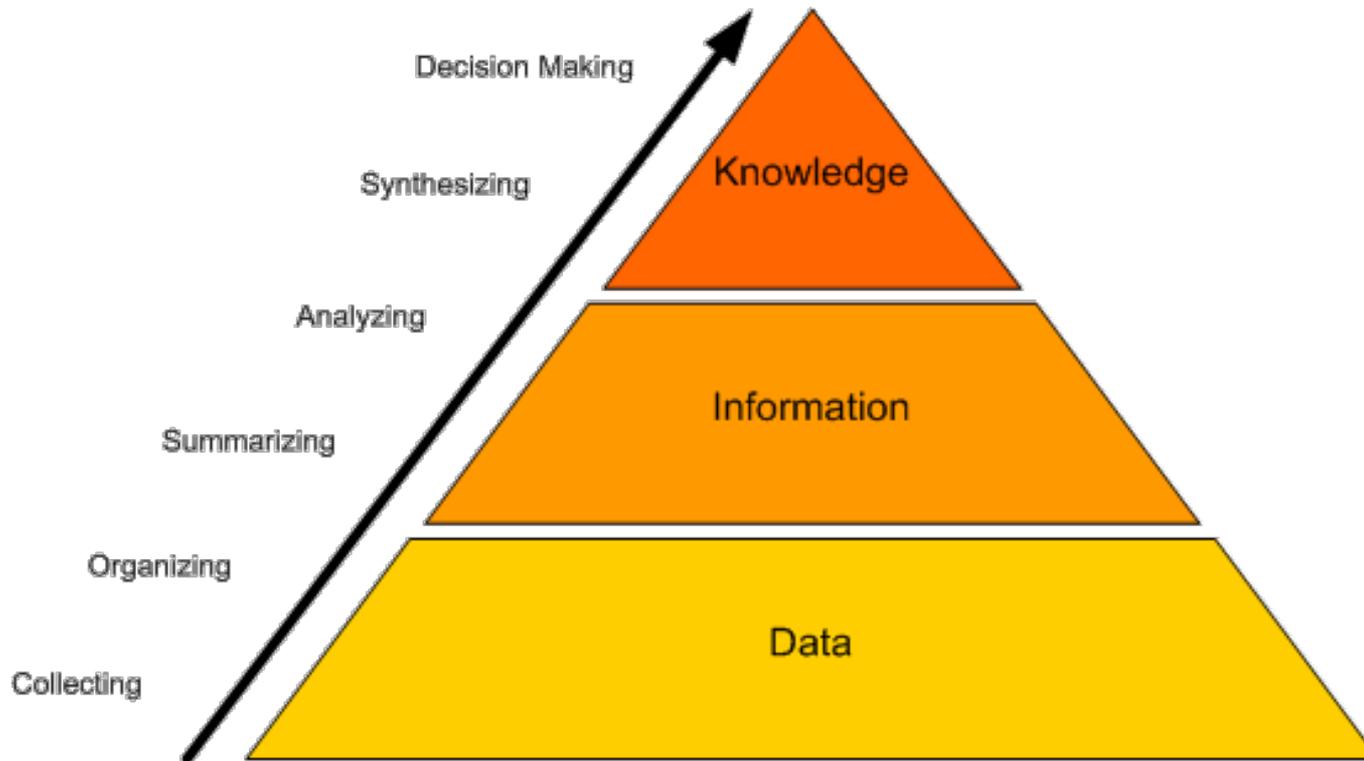
- **Service**
- **Document Collections**
- **Knowledge Management tools**
- **Imaging Center**
- **STI Center**



Information Challenge



Capturing, organizing, and storing knowledge and experiences of individual workers and groups within an organization and making this information available to others.



DTRIAC Vision Statement



“Identify and deliver **information of value** by building tailored, open architectures and secure information integration and sharing enterprise solutions to benefit the **entire** CWMD community.”



DTRIAC Way Forward



EXPAND

- Support DTRA's evolving threat reduction mission
- Apply knowledge management capabilities to solve current RD&E and operational challenges
- Support a broader range of threat reduction and CWMD communities

EXTEND

- Support the mission essential directorates and enabling functions
- Support IAC and DTRA knowledge management initiatives
- Upgrade information management technologies
- Assimilate CBRNE databases

PRESERVE

- Maintain the collection
- Maintain the knowledge base (KB)
- Digitize and provide access to KB
- Support specialized TATs

User Benefits

- Definitive source for CWMD
- Advanced data fusion and analysis capability
- Integrated DTRA-wide KM support
- RD&E and Operational support



DTRIAC Information Management

Ability

To find key information across the enterprise

DTRIAC

Ability

To discover new info and relationships

DTRIAC

Ability

To make decisions with confidence

DTRIAC

Discover

- Store and manage data
- Single sign-on access
- Full text search and browse
- **Federated search**
- Collections

Understand

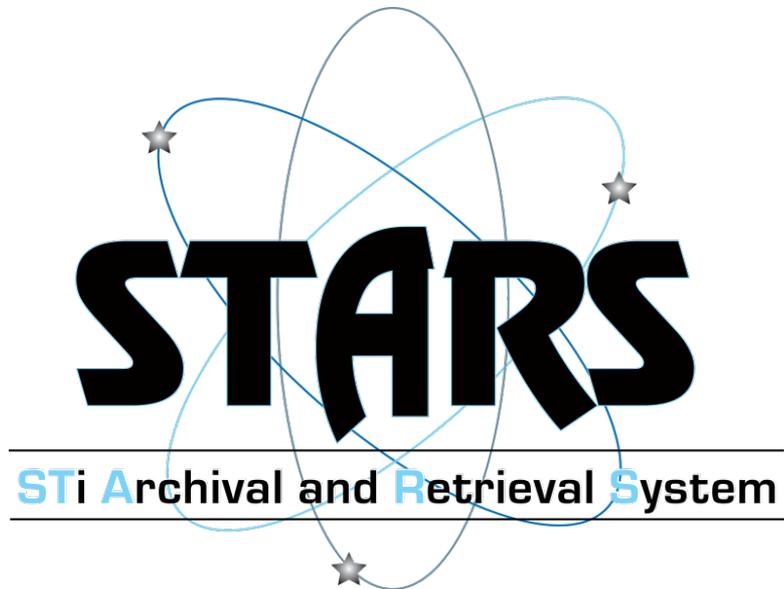
- Statistical analysis
- Entity extraction
- Entity analysis
- Advanced visualization

Action

- Library support
- STINFO support
- SME interaction
- Database access



Next Generation STARS



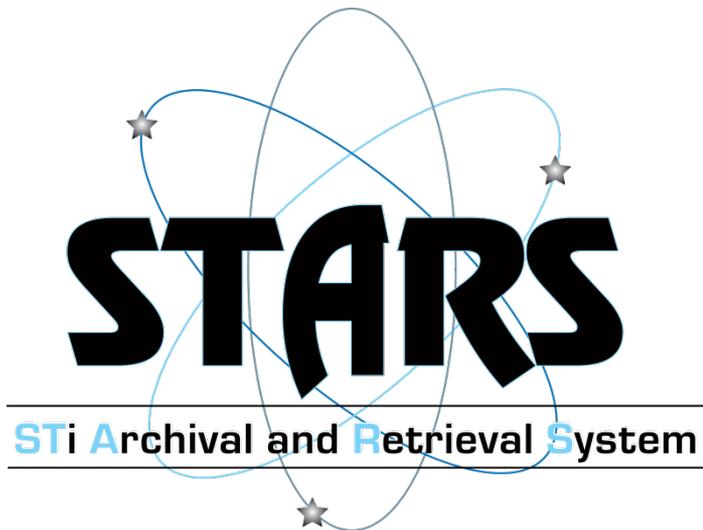
STI Archival & Retrieval System



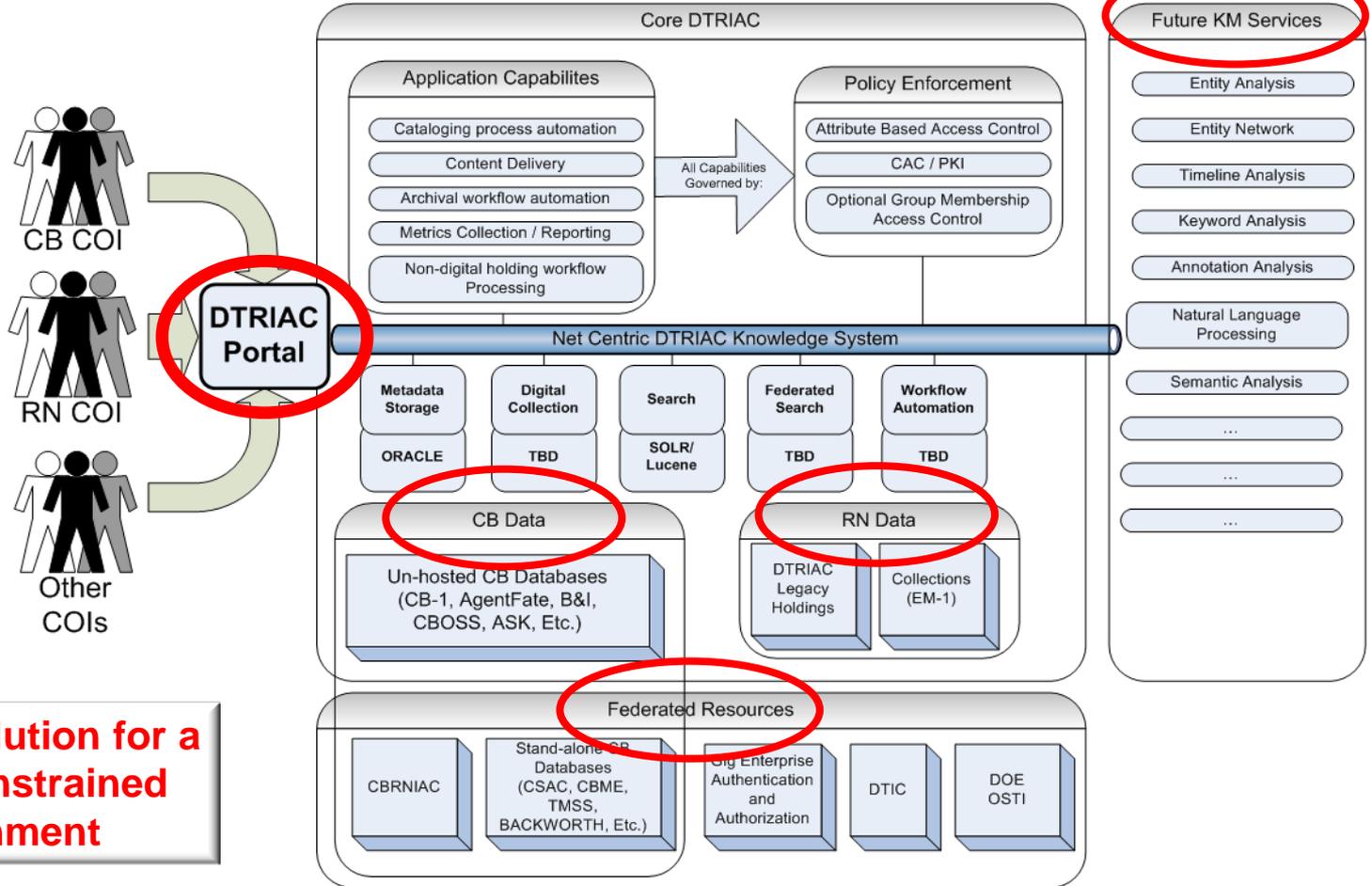
STARS is the DTRA's strategic data preservation and knowledge management information system.

STARS preserves data (reports/ documents, photographs, film, waveforms, tables, and diagrams) and the knowledge of the many experts in a single, readily accessible database, effectively archiving these diverse data forms while providing users with data access via search engines, online data analysis tools, and a data ordering system.

There are two STARS systems; STARS-U for unclassified data and STARS-C for classified data.

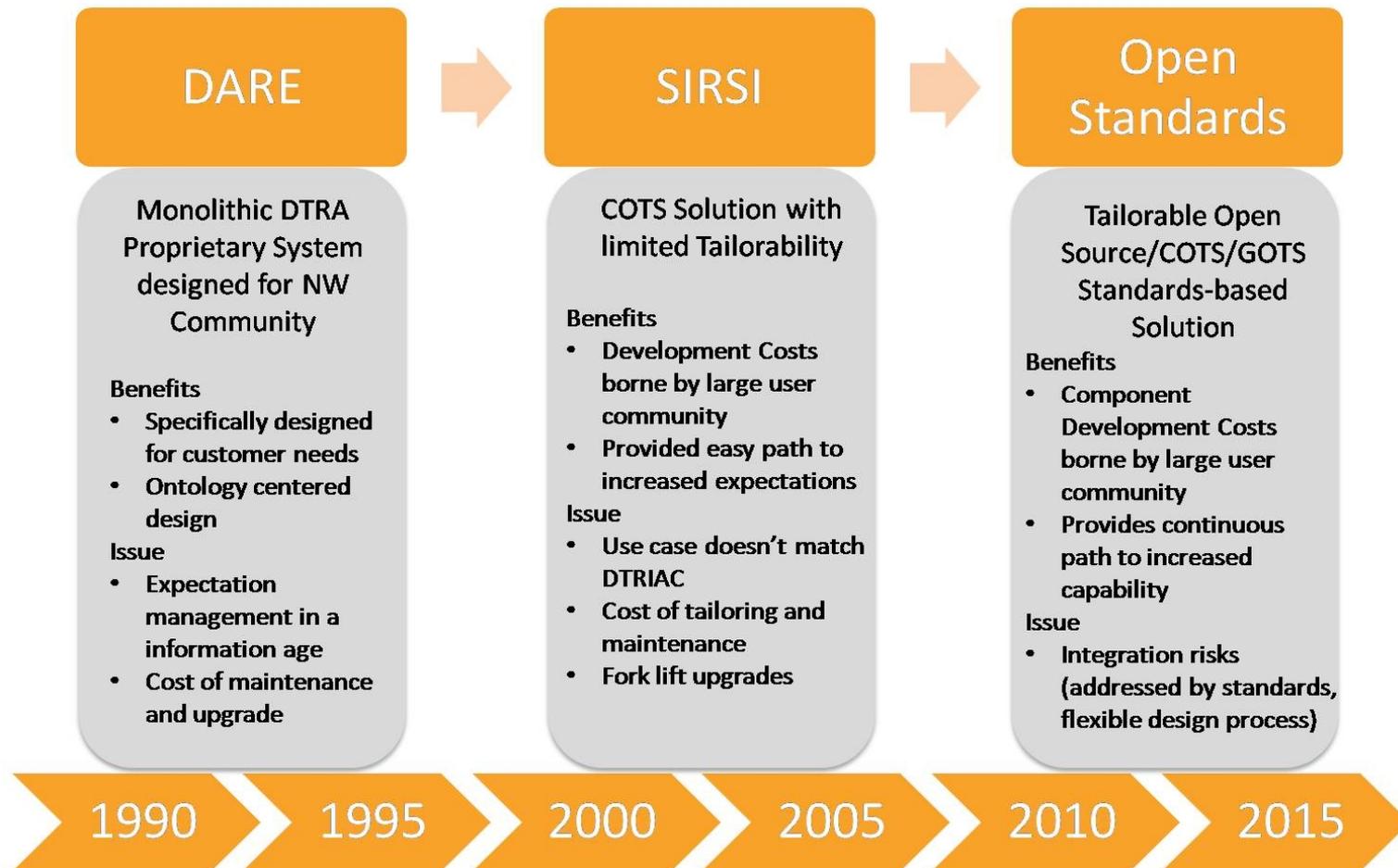


DTRIAC Architecture



The right solution for a budget-constrained environment

Evolution of Technology



Solr – Search Capability



Connecting users with the content they need
when they need it

Key features:

- Field search
- Boolean operators
- Synonym Injection
- Stemming
- Phonetic Search
- Faceted Search
- Document and field boosting

Key Capabilities:

- Advanced Full-Text Search Capabilities
- Optimized for High Volume Web Traffic
- Standards Based Open Interfaces - XML, JSON and HTTP
- Comprehensive HTML Administration Interfaces
- Server statistics exposed over JMX for monitoring
- Scalability - Efficient Replication to other Solr Search Servers
- Flexible and Adaptable with XML configuration
- Extensible Plugin Architecture

Solr Search: HEART example



The **Journal of Radiation Effects Research and Engineering (JRERE)** is the published proceedings of the annual **Hardened Electronics and Radiation Technology (HEART) Conference**. The JRERE is published by the **Defense Threat Reduction Agency (DTRA)** as a vehicle for refereed, technical articles that carry a security classification or distribution limitations. Classified and unclassified papers are published in separate volumes. The scope of the JRERE includes all aspects of the theory and application of nuclear radiation effects, such as neutron effects on electronics or biomedical effects of ionizing radiation, as well as indirect effects.

This database collects unclassified papers from JRERE Volume 25-1 through Volume 30-1, corresponding to presentations at HEART conferences from 2005 through 2011. The tool is designed to allow full text searches on the content of the papers.



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[ANALYSIS OF CAVITY SGEEMP EXPERIMENTS AT THE OMEGA LASER FACILITY](#)

Author: T. Stringer, N. Dumcum, D. Beutler, C. Coverdale, J. Dudley, J. Jones, D. Osborne, K. Fournier,
 Date Created: Fri Aug 14 00:57:03 EDT 2009
 Classification: U
 Caveat: Dist-C/ITAR

... ANALYSIS OF CAVITY SGEEMP EXPERIMENTS AT THE OMEGA LASER FACILITY ...
 ... ANALYSIS OF CAVITY SGEEMP EXPERIMENTS AT THE OMEGA LASER FACILITY T. Stringer and N. Dumcum ITT Corporation ...

[EXTENSIVE CABLE SGEEMP EXPERIMENTS FOR CODE VALIDATION](#)

Author: E.F. Hartman, T.A. Zarick, T.J. Sheridan, W.C. Fan, C.D. Turner,
 Date Created: Tue Mar 09 11:23:31 EST 2010
 Classification: U
 Caveat: Dist-C/ITAR

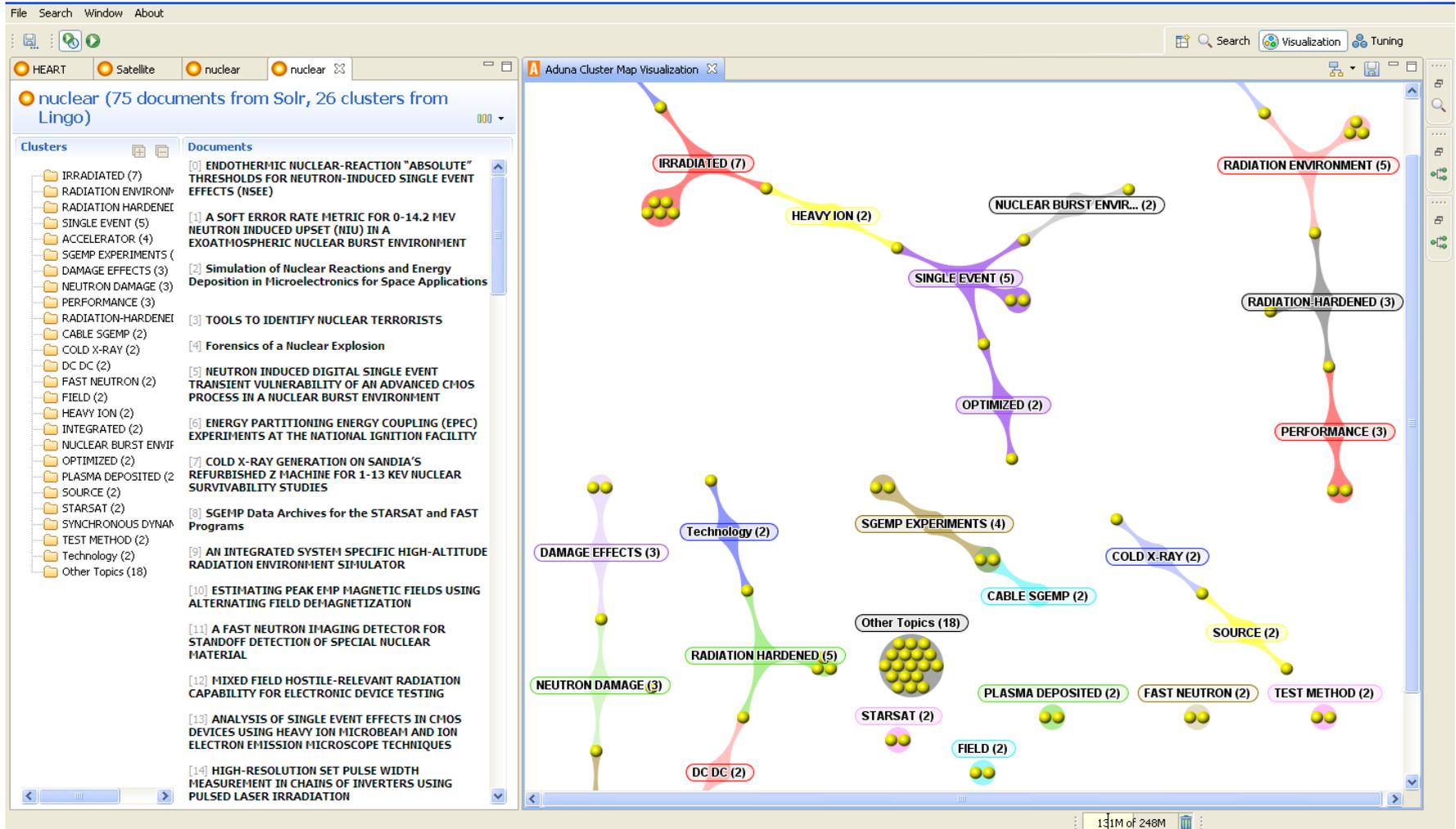
... EXTENSIVE CABLE SGEEMP EXPERIMENTS FOR CODE VALIDATION ...
 ... EXTENSIVE CABLE SGEEMP EXPERIMENTS FOR CODE VALIDATION E.F. Hartman, T.A. Zarick, T.J. Sheridan, W.C. Fan ...
 ... experimental data obtained to validate the Cable SGEEMP module within the Sandia RAMSES code system. These ex ...
 ... are given for selected Cable SGEEMP experiments. Introduction Strategic missile weapon systems are required ...
 ... This phenomenon is referred to as System Generated Electromagnetic Pulse (SGEMP). X-ray induced SGEEMP represents ...
 ... by SGEEMP by their very nature of formation are generated beyond the first layer of electromagnetic ...
 ... shielding and protection (i.e., the weapon's outer case). Historically, many measurements of cable SGEEMP ...
 ... survive SGEEMP 5-6 Today the UGT capability is no longer available and there exists no SGEEMP test ...
 ... capability that even approaches the threat-level conditions. As a result, a robust SGEEMP computational ...
 ... modeling and simulation when applied to radiation environment certification of Cable SGEEMP threats ...

- Full-text index
- Apache Solr is an open source search server based on Apache Lucene Java search library.
- Google-like interface with "Search box" for users to enter terms

Analytics: Gap Analysis



Solr Analytics: HEART example



Contact Information



Defense Threat Reduction Agency
DTRA/OP-ONIUI
1680 Texas St, SE
Kirtland AFB, NM 87117-5669

Program Manager
Lt Col Craig Hess
craig.hess@dtra.mil
(505) 846-2071





BACK-UP SLIDES

Enabling Capabilities



- Supports open-search federation
 - *structured* (databases and spreadsheets)
 - *unstructured data* (reports, PDF, text documents, graphs, etc.)
- Serves *human analysts and software consumers*
 - *Serves documents and reports*
 - *Serves databases*
- Supports data pedigree and quality extensions
- Allows data to be stored in a distributed manner
- Plug and play addition of analytic tools
- Supports a number of communities of interest
- Single sign-on, role-based security model

DTRA CIO Information Goals

- **Goal 1** - Establish DTRA Information Management (IM)/Information Technology (IT) governance to forge a knowledge-based organization
- **Goal 2** - Integrate quality service across the DTRA Knowledge Enterprise (DKE)
- **Goal 3** - Enable a single DTRA net-centric infostructure
- **Goal 4** - Institutionalize a Knowledge Management System to project DTRA's WMD expertise
- **Goal 5** - Achieve Information Assurance (IA) excellence



Contact Information

Lt Col Craig Hess, Program Manage

Defense Threat Reduction Agency

DTRA/OP-ONIUI

1680 Texas St, SE

Kirtland AFB, NM 87117-5669

craig.hess@dtra.mil

(505) 846-2071

Ms. Karen Burrows, DTIC Moderator

703.767.9100

kburrows@dtic.mil



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