

NDCEE

National Defense Center for Environmental Excellence



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(Installations and
Environment)

Advanced Internet Data Search Portal for Environmental Applications

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Technology Transfer—Supporting DoD Readiness, Sustainability, and Transformation

Report Documentation Page

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Motivation for Project

- Effective Government decision-making for Environmental, Safety and Occupational Health (ESOH) technology investments and operations requires current information on many issues, including:
 - Related technology developments and trends
 - Active organizations / individuals
- Massive amounts of relevant information exist on the web, but are scattered across many sources and are often not readily available
 - Technology press releases
 - Organization web sites
 - Technical and trade journals
 - Conference proceedings
- Gathering and understanding this data is a significant challenge for program managers, technology developers, technology purchasers, and other decision-makers

The Problem

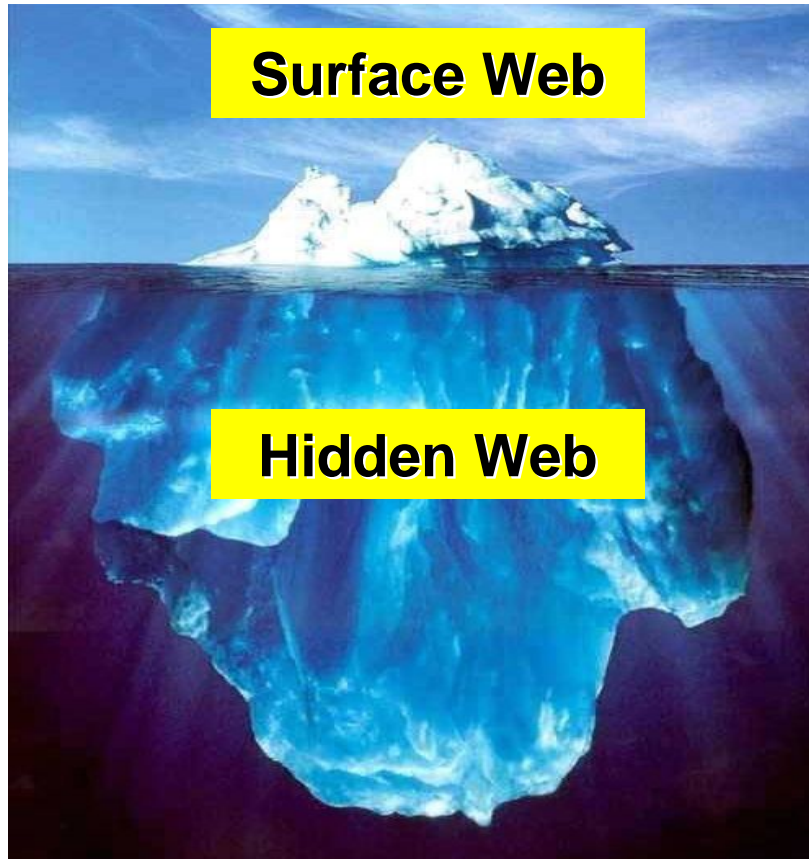
General search engines index only the “Surface Web” – only reaching 16% of the available information

16%

Surface Web

84%

Hidden Web



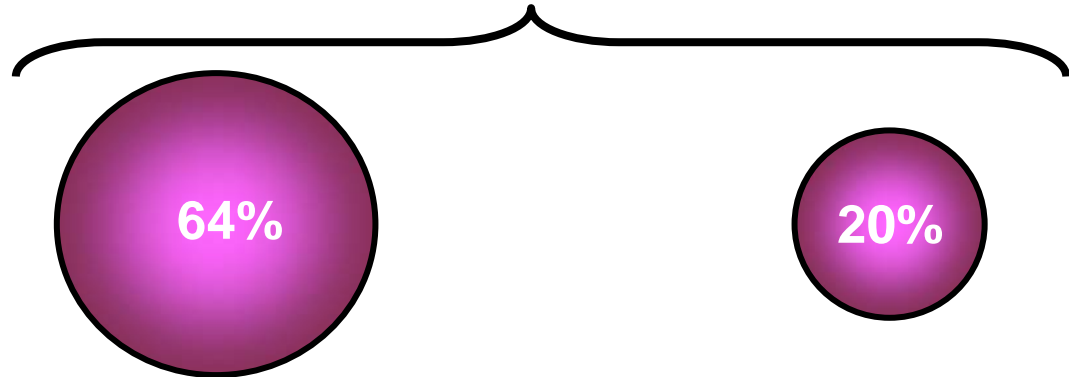
Categories of Web Information

SURFACE WEB



- **Free Access**
 - Indexed by search engines such as Google

HIDDEN WEB



- **Free Access**
 - **Not** indexed by traditional search engines
 - Need to know where to look and how to search

- **Restricted Access**
 - Paid Subscription or Registration
 - **Not** indexed by traditional search engines
 - Need to know where to look and how to search

Deep Web Examples

Resource Category	Sample Sites	Find Using Google?	Find with Deep Web Search?
New Product Announcements – Sites that publish press releases, product announcements or featured products	GlobalSpec – Product Announcements Reed Business Information	No	Yes
Trade Journals – Journals devoted to specific applications, typically include product directories, product announcements, articles by company representatives	Pennwell – Water & Wastewater International Paint & Coatings Industry Magazine	No	Yes
Technical Literature – Technical journals containing articles from universities and companies	SciRus SciTation Google Scholar	No	Yes
Product directories	Thomas Register Global Spec – product directory	Limited	Yes
Funded Research	EPA Funded Research Clu-In	No	Yes

The Benefits of a Deep Web Search Portal

- Opening up relevant portions of the hidden Web (84% of the total web) to routine searching – would allow a consistent set of resources to be available to all users
- More targeted searching of the best sites – site source list updated by site manager so new sites become available to all users as they are identified
- Automatic quick searches of the best sites for priority topics and materials needed – user does not need to learn the search commands for several different sites
- Faster searches of relevant Web sites for environmental technologies – cuts wasted time finding sites
- On-line ability to organize and screen post-search results – cuts wasted time to evaluate initial search results
- Reduced risk of missing key information that could affect future environmental actions

Task Objectives

1. Develop and test an advanced, strategic data search and analysis system prototype based on commercial-off-the-shelf (COTS) tools for online searching
2. Identify a Department of Defense (DoD)-wide group of potential system users and other stakeholders to test the prototype design and support operational implementation
3. Develop the business model for operational system deployment and the roadmap to full implementation for DoD users

Objective 1 Accomplishments- Prototype System

- **Completed User Needs Assessment**
- **Completed Prototype System Design**
 - Screened 34 COTS deep web search engines
 - Evaluated 7 leading COTS deep web search engines
 - Selected 2 COTS vendors for demonstration
 - Bright Planet (<http://www.brightplanet.com/>)
 - Deep Web Technologies (<http://www.deepwebtech.com/>)
- **Developed Prototype Advanced Web Search Portal**
- **Completed Proof of Concept Demonstration/ Validation for the two candidate systems**
- **Identified a third candidate system with potentially superior capabilities at reasonable cost** – Exalead (<http://www.exalead.com/search>)

Deep Web Mining Approaches

APPROACHES	HARVESTER	FEDERATED	CRAWLER
DATA COLLECTION METHOD	Collects materials from identified sites based on defined filter, reindexes materials for additional search capabilities	Connections are configured for defined Web sites, search is run simultaneously on all sites	Indexes designated sites, index identifies key concepts and incorporates additional capabilities
ADVANTAGES	<ul style="list-style-type: none"> ■ Focused collection reduces search time ■ Material can be organized into categories for browsing 	<ul style="list-style-type: none"> ■ Searches are not restricted by filter concepts ■ Limited field searching may be available ■ Results are always current 	<ul style="list-style-type: none"> ■ Searches are not restricted by filter concepts ■ Taxonomy or search suggestions available ■ Provides both speed and flexibility of search topic
DIS-ADVANTAGES	Certain sites, such as <i>GlobalSpec</i> , cannot be harvested	Quality of search results depend on quality of each site's search engine	<i>Proof-of-concept not completed</i>
EXAMPLE SYSTEMS	BrightPlanet	Deep Web Technologies	Exalead

Key Features of the Prototyped Systems

■ Design Concept:

- “One-stop shopping” Web portal for searching pre-selected online sites, including deep Web applications, to access ESOH technology, news and other information
- Efficient, useful responses to straightforward search queries

■ Key Components:

- COTS deep Web search tools (three tools selected for evaluation)
- Search results provided as highly ranked URL locations
- Search results files can be manipulated for screening and organization of key content

■ Access: Password-protected access for authorized DoD users

■ User Interface: User-friendly to accommodate novice searchers

Objective 2 Accomplishments – Project Stakeholders

Agency	Organizations	Individuals
OSD	5	10
Army	7	15
Navy, Marines	8	19
Air Force	5	11
NASA	1	2

Objective 3 Accomplishments- Business Model (Still Being Refined)

- Use DENIX as Search Engine Host, User Access, & Help Desk
- License Deep Web Search Engine via DENIX Program Office
- Use ESOH Advisory Groups to define lists of primary web sites for searches to keep system responsive to their search requirements:
 - PAO Review
 - RDT&E Investment
 - Emerging Contaminants Tracking
 - Equipment/Services Procurement
- Contract for Paid Subscription Sites via DENIX Program Office
- Advisory Group & Search Engine Support provided by NDCEE
- Cost Sharing Between DENIX Program Office & Primary Users
 - Target Using Organization Cost About \$50K

Next Steps

- Plan and execute final COTS system proof-of-concept demonstration (June 2007)
- Final Design Report (July 2007)
- Technology Transfer Information Report: Business model and roadmap to operational system design and use (August 2007)
- Final Task Report (September 2007)

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